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MEDICAL GYNECOLOGY

MEDICAL GYNECOLOGY

BY

HOWARD A. KELLY, A.B., M.D., LL.D., F.R.C.S. (Hon. Edinb.)

PROFESSOR OF GYNECOLOGICAL SURGERY IN THE JOHNS HOPKINS UNIVERSITY, AND GYNECOLOGIST TO THE JOHNS HOPKINS HOSPITAL, BALTIMORE; FELLOW OF THE AMERICAN GYNECOLOGICAL SOCIETY; HONORARY FELLOW OF THE EDINBURGH OBSTETRICAL SOCIETY; HONORARY FELLOW ROYAL ACADEMY OF MEDICINE IN IRELAND; FELLOW BRITISH GYNECOLOGICAL SOCIETY; HONORARY FELLOW GLASGOW OBSTETRICAL AND GYNECOLOGICAL SOCIETY; HONORARY MEMBER OF THE ROYAL MEDICAL SOCIETY OF EDINBURGH; CORRESPONDIRENDES UND EHRENMITGLIED DER GESELLSCHAFT FÜR GEBURTSHÜLFE ZU LEIPZIG; EHRENMITGLIED DER GESELLSCHAFT FÜR GEBURTSHÜLFE U. GYN. ZU BERLIN; CORRESPONDIRENDES MITGLIED DER K. K. GESELLSCHAFT DER AERZTE IN WIEN; MEMBRE ASSOCIÉ ÉTRANGER, SOCIÉTÉ D'OBSTÉTRIQUE, DE GYNÉCOLOGIE ET DE PEDIATRIE DE PARIS; MEMBRE CORRESPONDANT ÉTRANGER DE LA SOCIÉTÉ DE CHIRURGIE DE PARIS; MEMBRE DE L'ASSOCIATION FRANÇAISE D'UROLOGIE, PARIS; MEM. HON. SOCIETÀ ITALIANA DI OSTETRICIA E GINECOLOGIA, ROME, ETC., ETC.

WITH ONE HUNDRED AND SIXTY-THREE ILLUSTRATIONS
FOR THE MOST PART BY MAX BROEDEL AND A. HORN

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TO THE IDEAL GENERAL PRACTITIONER, A MAN OF WIDE CULTURE IN HIS PROFESSION, IN CLOSE TOUCH WITH ALL THE SPECIALTIES, THE BELOVED FRIEND OF HIS PATIENTS, AND ABOVE ALL, IN EVERY RELATION OF LIFE A SINCERE AND A DEVOUT CHRISTIAN:

TO

DR. BRICE W. GOLDSBOROUGH

THIS BOOK IS

AFFECTIONATELY DEDICATED

PREFACE.

WHAT a transformation two generations have witnessed in the field of gynecology! From modest beginnings, as a sort of a minor specialty coupled with diseases of children and often professed by general practitioners with no special training, it has grown to the dignity of a major surgical specialty, so extensive that many gynecologists of to-day claim the entire field of abdominal surgery as their proper domain by right of discovery and conquest. This period of surgical evolution is now at last clearly at an end and I deem it a fitting time to review once more, from our new and advanced standpoint, the relationship of our specialty to the field of general practice.

To my mind the evolution of scientific medicine must ever run this course: The general practitioner yields up to a little group of investigators that portion of his territory which is most obscure and difficult, in which he has made the least progress; the field is diligently cultivated and a specialty is formed. Then in time the specialist so simplifies the etiology, the diagnosis, and the treatment, that he is able to hand back a part at least to the general practitioner, with whom he continues in relations of harmony and sympathy, so that both work conjointly to a common end, namely, the extinction of disease and the amelioration of its ravages. It will be my effort in the following pages to review my special field, in an endeavor to return to the general practitioner that portion of it which he ought to recover by right of his prior lien.

Two subjects stand out preëminently as the field of the practitioner of medicine, namely, hygiene and prophylaxis. He also sees and is often perplexed by the sequelæ of the various gynecological operations. A variety of minor operations he must often be prepared to do, notably, suture of the recently torn perineum, dilatation and curettage of the uterus, etc. Largely in his hands also lies the fate of the great army of cancer patients, who to-day apply to the specialist, as a rule, too late for relief.

I have often heard the cry *ne sutor ultra crepidam*, during the twenty-five years I have been practising medicine, but it has not seemed to me to be trespassing too far on other fields to take up such every-day topics as hysteria and its allies, headache, backache, and constipation.

I am indebted to the kind coöperation of my friend and colleague Dr. Lewellys F. Barker for the chapter on neurasthenia, hysteria, and psychasthenia. This chapter offers the first explicit and detailed statement which Professor Barker has as yet made touching his methods of dealing with this class of cases. It constitutes a most difficult branch of therapeutics with which his name is associated as a pioneer, and I am thankful to have this definite expression of ideas from such an authority upon a subject in regard to which the gynecologist so often stands in need of the advice of an expert neurologist. Dr. Lilian Welsh, Professor of Physiology in the Woman's College of Baltimore, and Dr. Mary Sherwood, Director of the Gymnasium at the Bryn Mawr School, have written the chapter on the hygiene of the growing girl, dealing with the most fundamental question of our work. My old friend Dr. Walter L. Burrage has written the chapter on gonorrhea as well as that on fibroid tumors of the uterus. Dr. Prince A. Morrow, our great American authority on venereal disease, has supplied that on syphilis; and abortion comes from the pen of Dr. Edward J. Ill. The section on movable kidney is by Dr. F. W. Griffith; enteroptosis is by Dr. Thomas R. Brown and masturbation by Dr. R. L. Dickinson.

The book has been fostered from its incipiency by my friend and co-laborer, Dr. Caroline Latimer, without whose aid it could not have been written. She has nursed it throughout with unwonted solicitude and after revision and correction sent it forth into the world to battle for a living.

I am indebted for help and suggestion to Dr. W. L. Burrage and Dr. C. F. Burnam through a large part of the book; to Dr. T. R. Brown in the chapter on constipation, headache, insomnia, and obesity; to Dr. G. W. Dobbin, Dr. Richard Norris, and Dr. J. M. Slemmons in the chapter on injuries and ailments after labor. Dr. W. S. Baer has given me valuable advice concerning the treatment of backache, in which chapter I draw special attention to sacroiliac disease, and Dr. G. L. Hunner has assisted me in revising the chapter on cancer.

The illustrations, one hundred and sixty-three in number, have almost all been made by Messrs. M. Brödel and A. Horn, my longtime faithful coadjutors. In many of them we have worked on comparatively new lines, securing a more realistic and greater artistic effect in certain cases where it was formerly necessary to rely solely upon diagrammatic representation. Such illustrations are line drawings of examinations, postures, methods of treatment, and others which will be readily recognized from their generic resemblance.

HOWARD A. KELLY.

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MEDICAL GYNECOLOGY.

CHAPTER I.

CONSULTING ROOM AND GYNECOLOGICAL EXAMINATION.

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THE CONSULTING ROOM.

The general practitioner who intends to practise gynecology ought to devote the best space on the first floor of his house to the reception of his patients. Whenever it is possible he should arrange for three rooms: a reception room; a consulting room, where he meets his patients and takes their histories; and an examining room with its paraphernalia, where the patient can prepare for the examination and dress in comfort afterwards.

The **reception** or **waiting room** ought to be cheerful, sunny, and clean; simply and attractively furnished, and well supplied with current light literature to beguile the period of waiting. Time is well spent in exercising ingenuity and taste to secure articles of furniture and wall decorations which show marked individuality. Unfortunately, not everyone realizes how important it is that the first impression made upon the patient should be a pleasant one, tending to inspire confidence in the physician to whom the patient is about to confide the most important interest in life, her health. A cheery kindly wife, a pleasant secretary, and even a bright-faced maid are all assets of much value in helping to hold a nervous impatient patient. It is a serious mistake to put an office in a basement in order to get it out of the way or to avoid sacrificing the family parlor; on the other hand, nothing is more dreary than the use of the family sitting room for such a purpose. Moreover, patients are never favorably impressed by an introduction to family portraits in crayon, nor by the cheap, gaudy pictures and startling plush furniture which are so common everywhere. Everything about the reception room should express seriousness of purpose, taste, and dignity. In other words, the physician should consider what object lesson his office shall teach to his waiting patients. It is also a mistake, I feel sure, whenever it can be avoided, to force patients to go to a large office building, use a common elevator, and wait in groups on benches, among the patients of other doctors. Such herding of the suffering and the sorrowful robs life of its refinement.

Again no one material quality in these days teaches such important spiritual lessons and appeals to patients' higher instincts more than scrupulous cleanliness in their surroundings. A bright clean reception room and a spotless examining room are instantly accepted as guarantee that the physician himself is a votary of the modern doctrine of antisepsis and carries it out in all his practice.

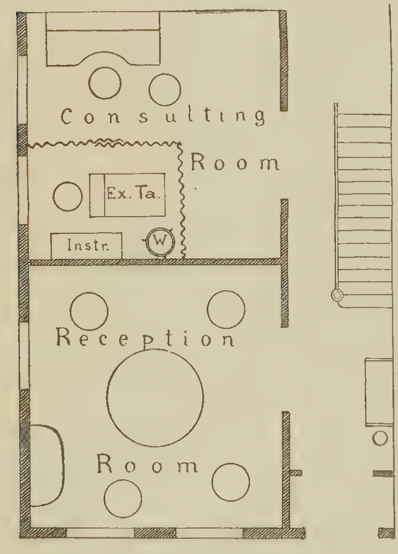

Fig. 1.—A Simple Form of Consulting and Reception Room. The examining table in the consulting room is placed conveniently to the light which falls on the back of the operator as he sits at the foot of the table; this corner of the room is screened off.

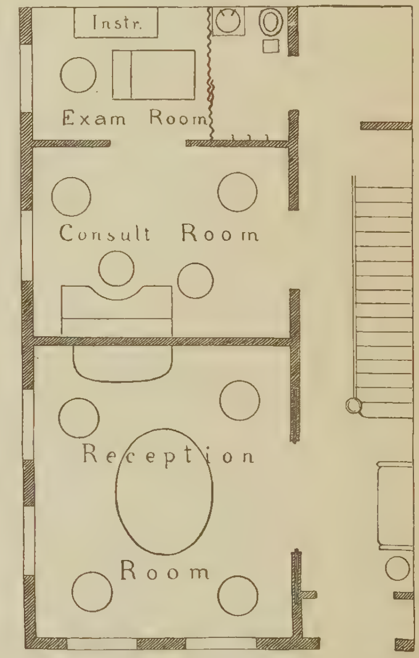

Fig. 2.—Arrangement with Examining Room Separated from the Consulting Room. The patient arranges her clothing behind the curtain indicated by the wavy lines.

A simple **office arrangement** is shown in Figure 1 in which, when space is limited, a portion of the consulting room is utilized as an examining room. A somewhat more elaborate arrangement is shown in Figure 2, including a reception room, a consulting room, and a separate examining room. The toilet arrangements in the examining room are placed at one end and behind curtains. When more elaborate arrangements still are necessary, I recommend the scheme in use in my own suite of apartments. There is first a large reception room, while adjoining that is the room where the secretary and typewriter have their desks; the consulting room is next to this, and behind there are three examining rooms. Washing and toilet facilities are provided in a separate apartment. Such an arrangement facilitates thorough work for the specialist whose time is precious and provides for the occasional patient who has to rest before leaving the house.

A nurse should always be on hand, if possible, to receive the patient and prepare her for examination, as well as to render any assistance required afterwards. She should be dressed in a regular nursing costume, with a scrupulously clean cap and apron, and she ought to be a woman of dignified appearance, preferably not too young. Nothing so serves to tone the patient up for the ordeal of an examination as a nurse of the right kind; indeed, she will in many instances be able to hold on to a patient who thinks of leaving the physician for another. If she has training and ability, she will often learn in time to give material assistance in investigating a case by emphasizing to the doctor the matters of complaint and directing his attention to those issues which seem paramount to the patient.

The physician should ever meet his patient with courtesy and a warm personal interest; showing by his manner that he esteems it a high compliment that she has been willing to entrust him with the care of her health.

History Taking.—There are three ways of taking a history: (1) to fill in an outline, such as that given in the text, and then to add the special matters complained of; (2) to let the patient ease her mind by first telling all her troubles, after which the outline is filled in; or (3) a combination of these two methods, by listening and asking occasional questions. No one way suits all cases. If a patient is nervous and distressed, a few routine questions directed in a kindly reassuring manner, will serve to give her time to collect herself and set her at ease. If she has her ailments much on her mind, and is impatient to pour them out, it will be best to let her talk freely at first, and then to fill in the outline afterwards. In each instance a general outline should be filled in and the history should be written down. After the name follows the residence, age, social state (married or not), and if married, how many children, miscarriages and labors, as well as the character of the menstrual period, as to regularity of intervals, duration, amount of flow, and pain. The occurrence of leucorrhea should then be noted. I think it is best, as a rule, at about this juncture to let the patient tell her own story briefly in her own words, interrupting occasionally if she becomes prolix or wanders off to unimportant details. While the patient is talking, the physician jots down his notes, taking up the line of her suggestions from time to time and asking more particularly and specifically regarding the nature of certain complaints. Having in this way secured a complete history, the outline is further filled in by suitable questions relating to all the other important organs in the body, including headaches, backache, digestion, regularity of the bowels, urination, etc. I find it an excellent course, while taking the history, to underline important facts; for instance, if the patient has it very much on her mind that she has no children, I write the word sterility and underscore it.

Date *Diagnosis*

Name *S W M* *age* *Resides*
Occupation *Par* *Mis* *Patient of Dr.*
Instr. deliv. *fever*

Menstr. Hist. *Gen. Appearance*
Weight
Headaches
Leucor. *Backache*
Sleep
Complains now of the following symptoms *Appetite*
Digestion

Bowels
Hist. of development of present condition *Urination*

Urinary Anal.

Bladder

Rectum

Gen. previous hist. *rheum.* *fevers, etc.* *Kidneys*

Family Hist. *Husband.*

Sketch

Physical Exam. of Pelvis and Abdomen.

Vag. Outlet
Vagina
Cervix

Uterus

Uterine tubes and ovaries

Outline of Treatment to be followed

If she has severe headaches, I underscore that word, and so on. If she has been told elsewhere that she has a tumor, I underscore the word. By thus underlining several catch words, the physician is not liable in the subsequent examination to overlook any ailment which the patient has much on her mind. I sometimes find it helpful, as I take a history or make an examination, to note down in a short column, one below another, the special complaints as well as any suggestions that occur to me as to lines of treatment to be carried out.

It is a good plan to fill out some such outline as shown on the opposite page in each case.

THE GYNECOLOGICAL EXAMINATION.

After taking the history, the next step is the physical examination. It is always important to bear in mind the purpose of such an examination, and to remember that especial care must be taken to discover the cause of the patient's discomfort or suffering. In making a gynecological examination it is necessary to bear in mind that the investigation of the pelvic organs is always a trial and source of distress to the patient who is not an habituée of the office. For his own sake as well as for the patient's, and as a mark of the respect which he owes to all womankind, the physician will always carefully protect the patient and avoid all undue exposure. The methods of examination in this country and in Great Britain have thus far ever been characterized by a modesty and a consideration for the feelings of the patient which do honor to our profession. When that sense of modesty becomes blunted, our specialty will have taken a lamentable and a distinctly retrograde step. Great care should also be taken not to expose a patient even when she is under anesthesia and unconscious, during preparation for an operation.

The first examination should include a consideration of every important organ of the body. The physician must never forget that a large percentage of his patients have other ailments than those which are covered by gynecology. The condition of the chest must be looked into, and inquiry made into a history of tuberculosis, pleürisy, or any form of heart disease. After a survey of the other organs, the physician concentrates his attention upon the abdomen, which must be studied from thorax to pelvic diaphragm with extreme care.

Instruments.—The few instruments necessary to the gynecological armamentarium in the examining room are:

Sims' speculum.
Nelson trivalve specula, 2 sizes, large and small.
Kelly cylindrical speculum, with long handle, for use in the knee-breast position.
Dressing forceps.
Tenaculum.
Uterine sound.

Traction or bullet forceps.
Packer.
Applicators.
Scarifier.
Cotton and wool pledgets, of various sizes.
Nitrate of silver solutions of varying strengths, from 5 to 40 per cent, in 2 oz. bottles of amber glass.
Boroglycerid, 6 oz.

Metal instruments are best sterilized in a fish-kettle by boiling in a 1 per cent solution of sodium carbonate for five minutes. After every use the instruments should be washed with soap and hot water and re-sterilized. There is great risk of spreading gonorrhea and even syphilis by the use of contaminated instruments. An ordinary washing or rinsing in hot water does not serve to render an instrument sufficiently clean for use. After sterilization all the instruments should be placed in an orderly manner on a clean towel, laid on a white porcelain ware tray, and covered with another towel so as not to offend the eye of the patient. The physician ought to wash his hands briefly with soap and water and a scrubbing brush before each examination, and thoroughly immediately after it is over. A sample of urine should, as a rule, be secured as part of the examination. The most satisfactory specimen is that which is taken by a nurse, after cleansing the orifice of the urethra, with a sterile glass catheter, having a piece of rubber tubing six inches long on the outer end, which serves to convey the urine into a sterile test-tube.

Preparation of the Patient.—The patient should be prepared for the examination by removing all clothes, baring the abdomen from thorax to symphysis. She ought always to remove her corsets. The physician ought not to consent to attempt an examination hampered, for example, by a union suit of underwear or by corsets. If the patient deems her condition serious enough to compel her to apply to a physician for examination, it is at least worth her while to offer him the best possible opportunity to make his examination with thoroughness.

The best **examining table** is a simple rectangular structure, like a big box with drawers or like a kitchen table, upholstered with leather or covered with a folded blanket and clean sheets (see Fig. 3); two supports, projecting about eight inches from the foot of the table, support a crossbar which may be notched so as to catch the heels. The under part of the table may be conveniently supplied with drawers and utilized for holding linen, supplies, etc. The measurements of the examining table that I use are: Length forty-five inches, breadth twenty-four inches, height thirty inches. I prefer a table of this kind to the various examining chairs advertised, although I began my work with a chair.

Abdominal Examination.—The examination is first made with the patient lying on her back. If the examiner's hands are cold, they should be immersed in warm water, after which the abdomen is palpated. It is my custom, and I think it is the best plan, first to feel the upper abdomen, running the hand across it and making pressure at several points, to make sure there are no undue prominences, or areas of tenderness, resistance, or fluctuation. I then examine the right hypochondrium, and if no resistance is felt, use both hands, pressing deeply into the right flank and feeling for the kidney. If this is not discovered at once, I tell the patient to breathe deeply, and this may bring it down between the fingers. Sometimes with the fingers pressing in deeply from behind and from the front simultaneously, a wedge within is felt, as the patient takes a deep breath, descending from under the ribs, entering the angle and pressing the fingers gently apart; with the act of expiration, the wedge retires back under the ribs again. In this way, the lower pole of the kidney can often be felt. With a deep inspiration it descends until it is felt as far as the renal notch, the second degree of displacement; or again, it slips down entirely below the fingers, which now lie above the upper pole, when the descent is one of the third degree. If the kidney cannot be felt in this way, it can sometimes be found by raising the head and shoulders and letting the patient lie on the left side, when the intestines drop away from the side under examination. On sitting up and leaning forward, or on standing up and leaning forward, a loose kid-

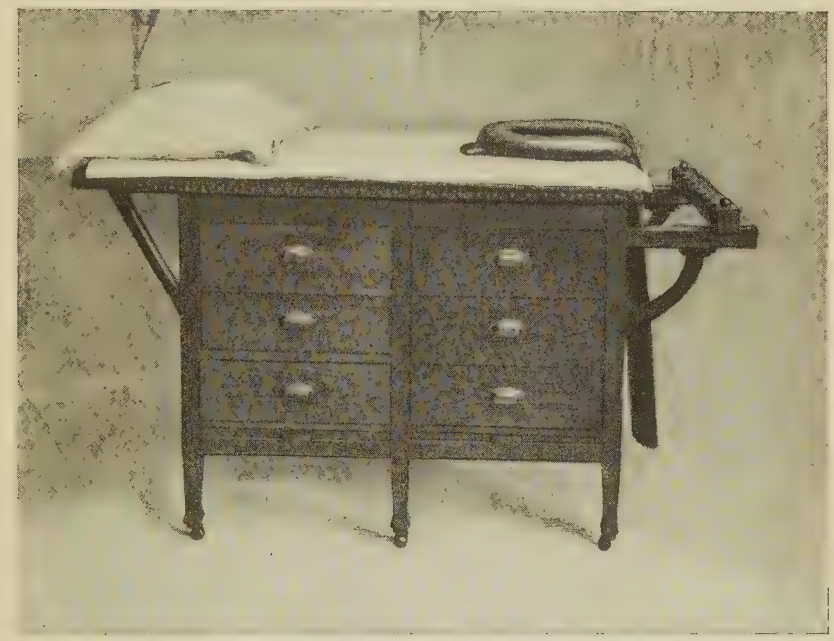

FIG. 3.—THE GYNECOLOGICAL EXAMINING TABLE. The top is covered with leather, well padded, on this is placed a blanket covered with a linen sheet. A drainage cushion is serviceable in protecting the table from contamination from discharges. In my office I sometimes use a much smaller cushion than that shown in the figure. The drawers serve for the storage of clean linen, towels, dressings, pessaries, etc.

ney can often be felt to best advantage; sometimes a markedly displaced kidney becomes evident only after the patient has been walking about a great deal just before the examination. The edge of the liver at times feels surprisingly like a kidney, but, as a rule, the sharpness of the edge serves to distinguish the liver. In thin patients, a distended gall bladder can often be felt, hanging pendulous into the abdomen from beneath the margin of the ribs. It is best to complete the examination of all the other abdominal organs before examining the stomach.

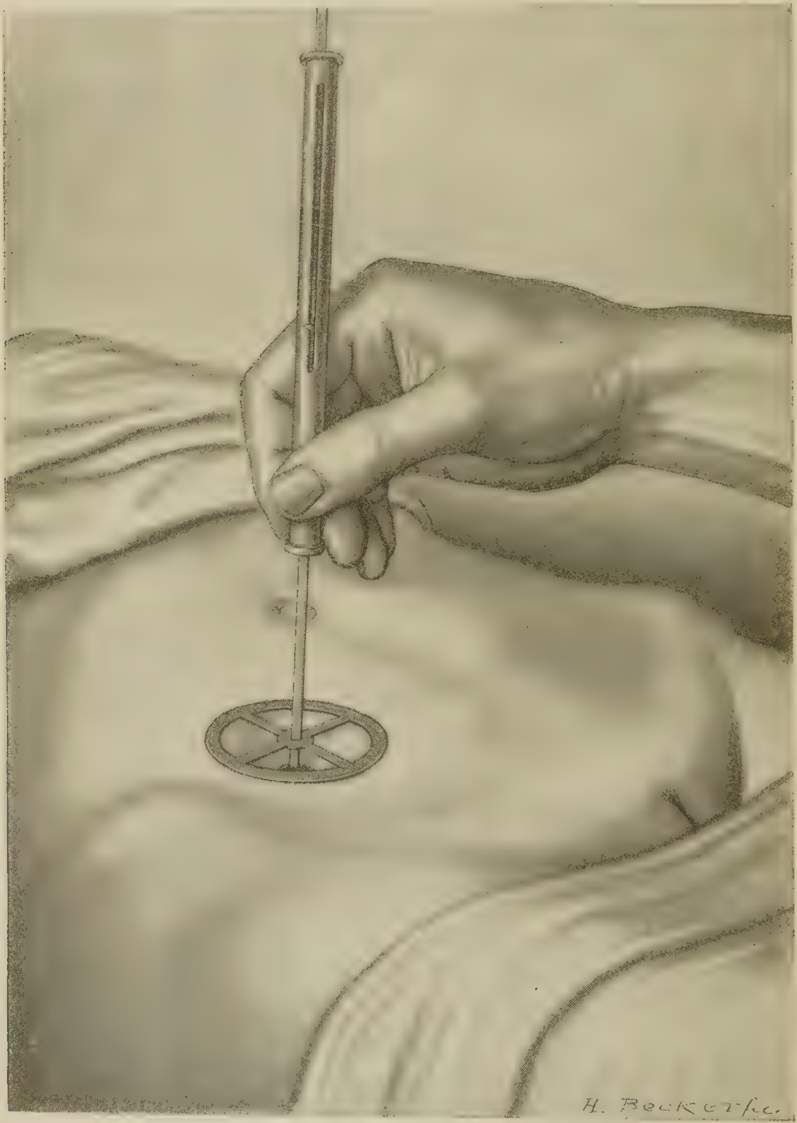

Fig. 4.—Piezometer Used to Register the Depth and Amount of Pressure Made. It is also a Pain Index.

The way to outline the stomach is to give a teaspoonful of the bicarbonate of soda dissolved in a small glassful of water, following this at once with a teaspoonful of tartaric acid in a like amount of water. The patient must drink lying down, and she must resist the impulse to belch up the gases which at once begin to distend the stomach visibly under the abdominal wall. This examination is best put last. The colon and the vermiform appendix are next palpated. If the patient complains of any tenderness or there is any reason to suspect appendicitis, a good way to compare the relative tenderness on the right and on the left sides is to use a piezometer (see Fig. 4), which is designed to register accurately the amount of pressure necessary to produce pain, as well as to record the resistance, by means of the depression made in the abdominal wall. The piezometer consists of a spiral spring in a hollow cylinder within which travels a piston ending in a button. If the button is pressed into the abdominal wall, the amount of pressure made is measured on an index, while the depth to which the button depresses the wall is measured by a wheel which slips freely up and down the shaft of the piston. The sigmoid flexure is palpated to discover any accumulations of fecal matter (see Fig. 5). The pelvis is palpated above the symphysis, by mak-

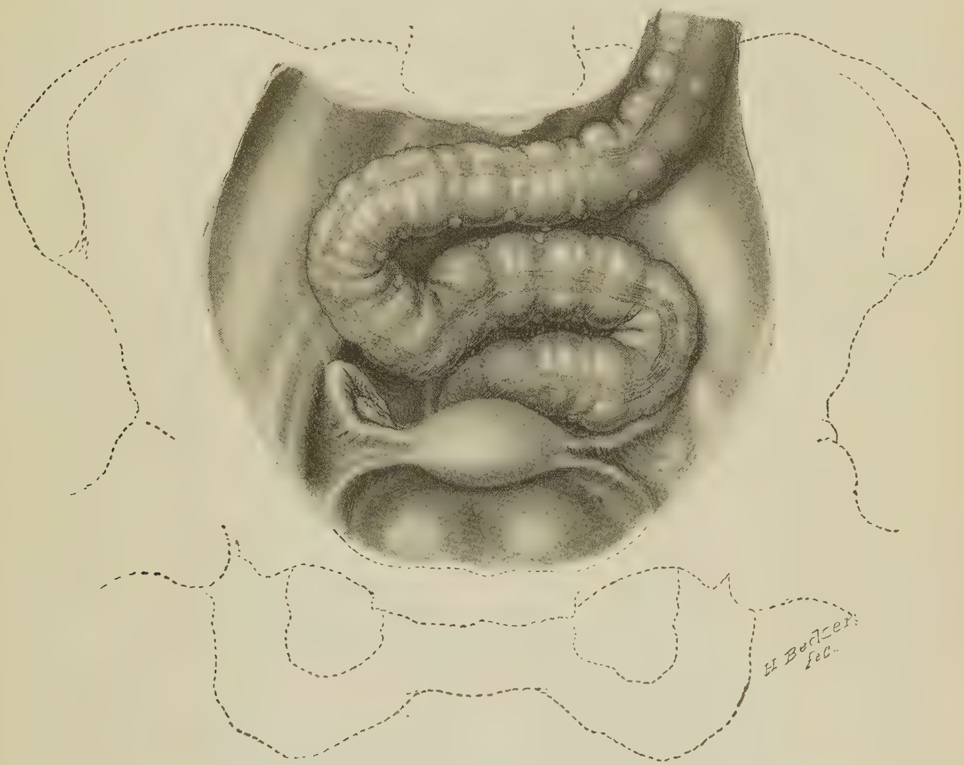

Fig. 5.—Deviation of the Sigmoid Flexure. The bowel crosses the promontory of the sacrum on the right side, then returns to the left pelvic brim, and drops into the pelvis just behind the uterus.

ing pressure inwards towards the pelvic floor and noting any areas of resistance or any tender spots.

Vaginal Examination.—The pelvic organs are next examined by the vagina, (a) by touch and (b) by inspection. In making such an examination, the points to be noted by inspection are:

(1) Changes in position (displacements).

(2) Peculiarities of form, size, or consistency, such as are produced by inflammations or tumors.

(3) Alterations in sensibility.

By touch the finger may recognize a lax, everted condition of the vaginal orifice, often found after multiple childbirth. The vaginal walls are next examined and may be found rugose and in their normal condition, or often, as in women who have borne many children, flaccid, smooth, and pouting. We thus note at once by touch whether or not the vaginal orifice is tightly closed, and whether the vagina occupies its normal relations to the pelvic floor, as it stretches back over the floor of the pelvis to the cervix which lies in the sacral hollow, or whether, on the other hand, the orifice is broken down and

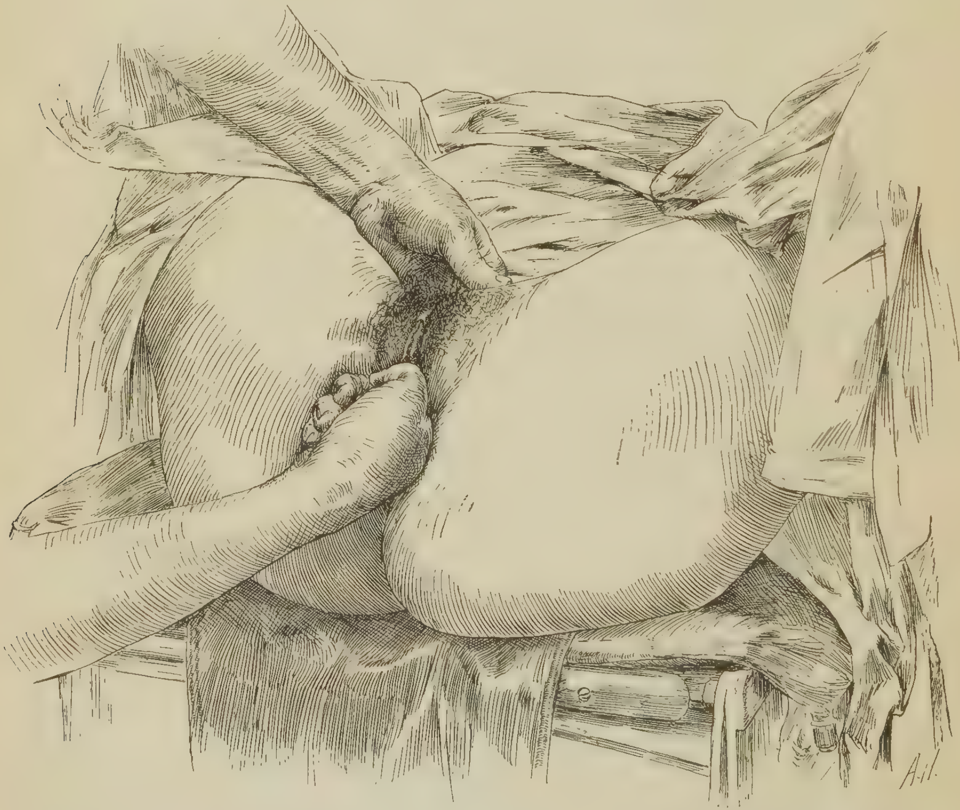

FIG. 6.—BIMANUAL EXAMINATION BY VAGINA AND ABDOMEN. The index finger of the right hand and the index, middle, and third fingers of the left hand are easily brought close together and used to question the structures lying between them.

the tissues are pouting, forming what has been appropriately called a sacropubic hernia (Berry Hart). The examining finger also notes carefully a cervix in descensus, that is to say, lying low down in the vagina, perhaps just behind the symphysis pubis, and the cervix in its normal position well back in line with the ischial spines. The form and size of the cervix are noted. The conical cervix, with a rounded hard surface, is readily distinguished from the fissured, infiltrated cervix, or a friable cervix converted into a cauliflower mass by malignant disease. If there is much vaginal discharge, it is well to wear a thin glove in order to protect the hand during such examinations, and avoid even the slightest risk of carrying over an infection to the next patient, perhaps a woman in labor.

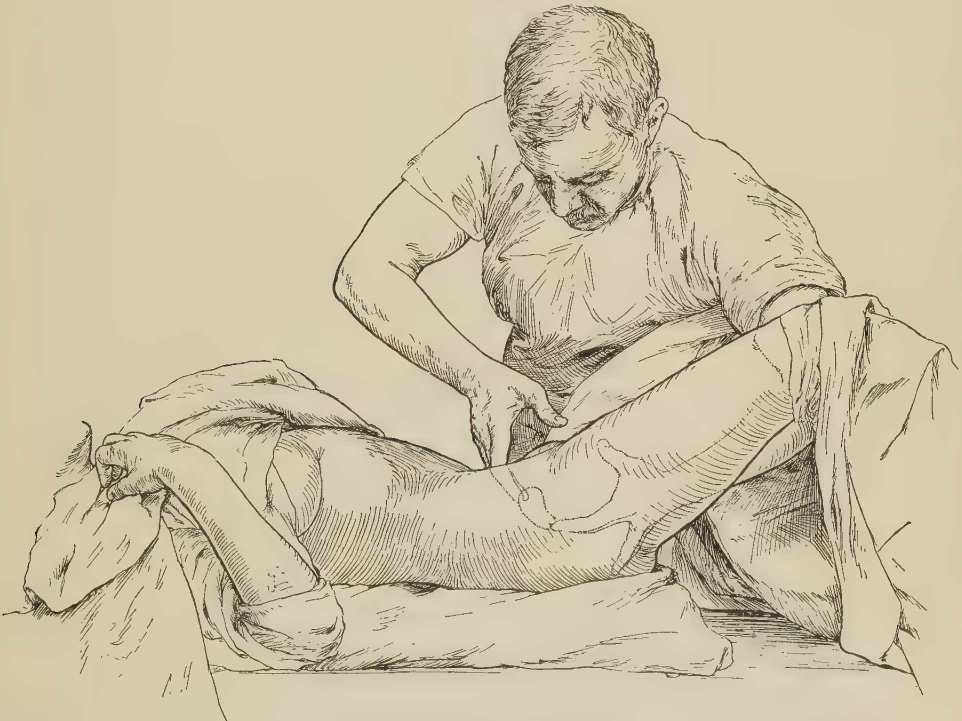

FIG. 7.—BIMANUAL EXAMINATION OF THE UTERUS. The upper hand indents the walls of the abdomen and rests upon the fundus while two fingers of the lower hand, introduced into the vagina, rest upon the cervix. Palpation in this way reveals the size and form of the uterus.

Bimanual Examination.—The examiner next investigates the condition and positions of the deeper pelvic organs by using his free hand through the abdominal wall to press down through the superior strait and act conjointly with the vaginal hand (see Figs. 6 and 7). A bimanual examination reveals the exact position of the uterine body, whether inclined forward in normal anteposition, or backward in retroversion or retroflexion. Then, displacing the uterus to the right or to the left, the condition of the uterine tubes and of the ovaries is investigated. If there is a simple enlargement, it is easily detected as shown in the figure; an enlargement associated with adhesions is recognized as a more or less immovable mass to one side or other of the body of the uterus. During the bimanual examination, the mobility of the organs is tested. The question must be asked and answered whether the uterus has its normal play, and whether or not the ovaries are free. This question of mobility of the uterus becomes a matter of the utmost importance in dealing with cancer. When a cancer is found in the cervix, the first important query is this: Has the disease extended beyond the uterus into the broad ligaments in the direction of the pelvic wall? The answer to this inquiry is found by attempting to throw the uterus up and down in the pelvis thus performing a sort of ballottement with it; if it feels fixed or hinged on one side, this, as a rule, constitutes a contra-indication to a radical operation. It must never be forgotten, however, in seeking to give the patient the benefit of every reasonable doubt, that the fixation may be effected by inflammatory and not by cancerous infiltration, and that it may also be due to an inflamed, adherent tubo-ovarian mass in one or both sides. The clearest approach to the pelvic organs above the vaginal vault is by the combined rectal and abdominal examination (see Fig. 8). The uterus, tubes, and ovaries are felt in this way with the utmost distinctness.

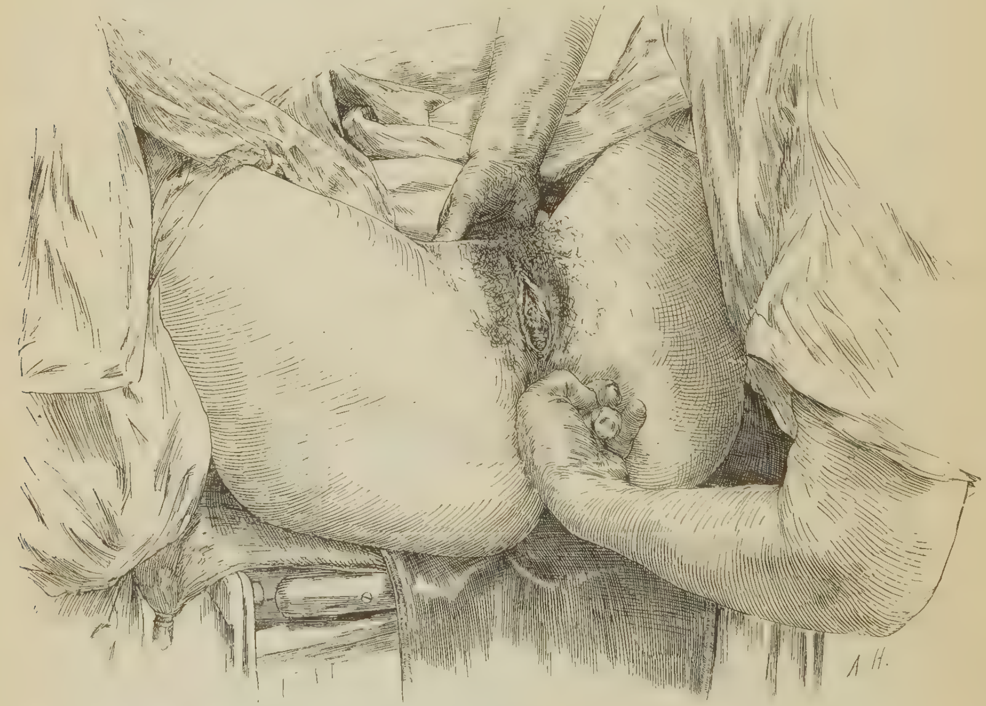

Fig. 8.—Bimanual Examination by Rectum and Abdomen. It is easily seen from this figure to what depth the index finger of the left hand can be carried into the rectum, in this way reaching the posterior surface of the uterus and both tubes and ovaries.

Before withdrawing the finger from the vagina, the bladder is palpated through the anterior vaginal wall, and the little delicate ureteral cords are felt, stretching from the position of the internal ureteral orifice around the pelvic wall to the side of the cervix in the lateral fornix above; the normal ureters are always quite small, freely movable cords. Any enlargement, or thickening, or irregularity indicates disease of the ureter and of the kidney on the same side. By thus discovering a thickened ureter in a case of pyuria, a diagnosis of tuberculosis of the kidney can often be made within a few seconds. Such a diagnosis must, of course, be confirmed by further topical examination and by urinary analysis. If the uterus is inclined to slip from under the examining finger in the ordinary recto-abdominal examination, it is sometimes a good expedient to fix the lower pole of the uterus with the index and middle fingers in the rectum, at the same time carrying the thumb into the vagina (see Fig. 9), and so locating and fixing the cervix; making a sort of trimanual examination, in which the uterus sits poised, as it were, on the

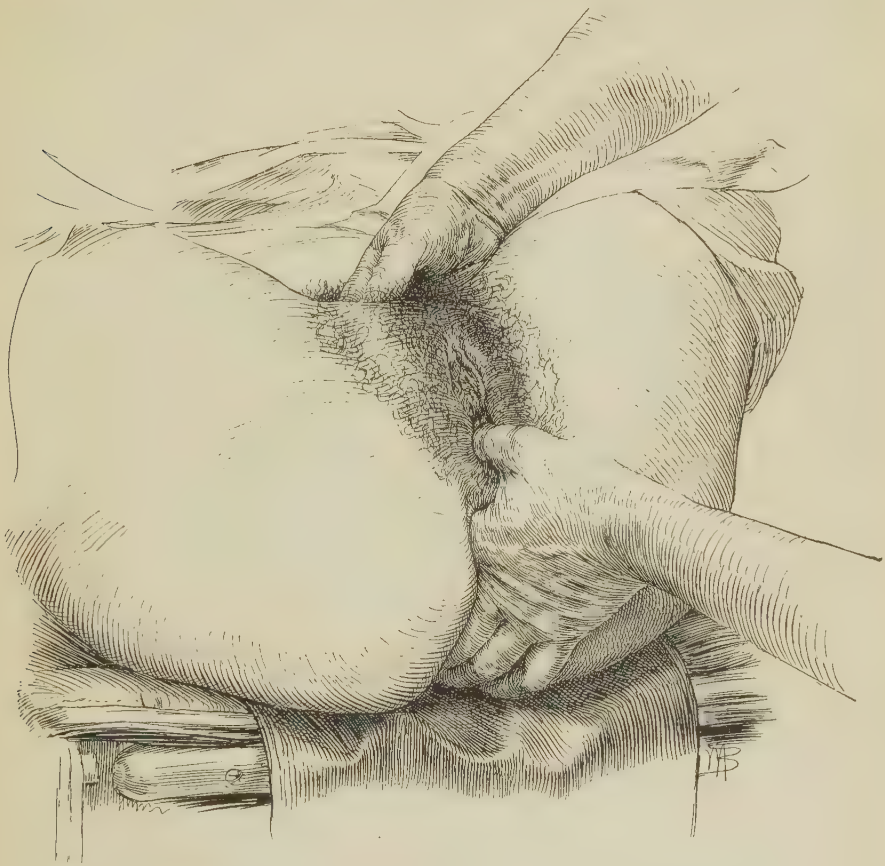

FIG. 9.—TRIMANUAL EXAMINATION SHOWING THE INDEX FINGER IN THE RECTUM PALPATING THE POSTERIOR SURFACE OF THE UTERUS WHILE THE THUMB OF SAME HAND LOCATES THE POSITION OF AND FIXES THE CERVIX.

fingers and thumb of the hand operating through the inferior strait, while the upper hand, palpating through the abdominal wall, examines the body of the uterus on all sides. (The method of examining the bladder is given in Chap. XXII.)

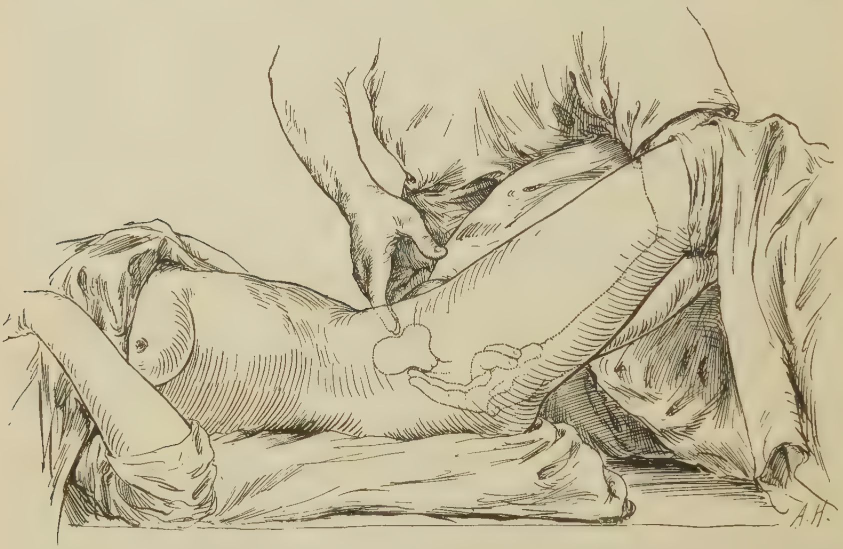

FIG. 10.—BIMANUAL EXAMINATION SHOWING THE METHOD OF PALPATING AND DISTINGUISHING A FIBROID TUMOR ON THE POSTERIOR SURFACE OF THE UTERUS.

When any enlargement of the intrapelvic structures is felt during a bimanual examination, the fundamental question to be answered is whether the growth is uterine or ovarian?

A uterine tumor (see Fig. 10) can be best outlined in a combined rectal and abdominal examination, as shown in the figure. The uterine growth

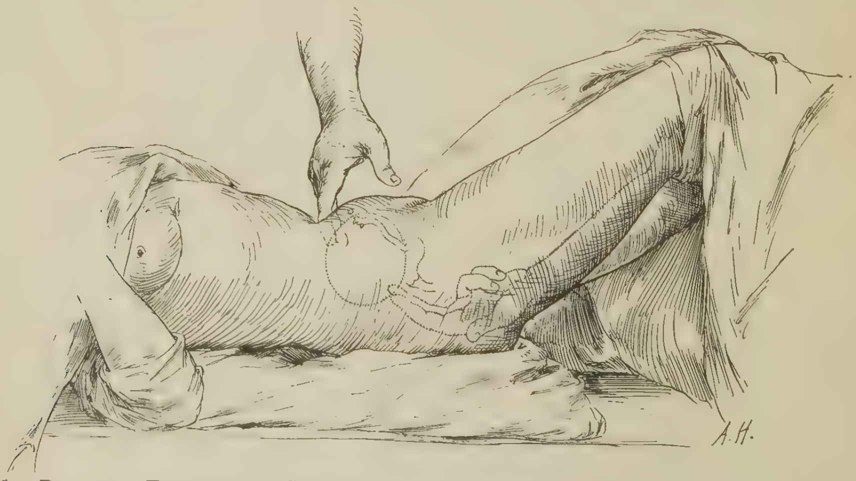

FIG. 11.—BIMANUAL EXAMINATION SHOWING THE METHOD OF DETECTING AN OVARIAN TUMOR LYING BACK OF THE UTERUS AND DISPLACING IT FORWARD.

is in this way felt to be continuous with the uterine wall, from the cervix up on to the growth and from the fundus down over its convexity. In moving the uterus the enlargement at once moves with it, and there is, as a rule, no appreciable interval between the two. The tumor is then uterine.

In such a case as that shown in the figure, the next question is whether the uterus is in anteflexion with a tumor imbedded in its posterior wall or whether it is in retroflexion with the tumor growing from its anterior wall. This question is usually easy to answer, as a uterine tumor, which is practically always a fibroid, is denser than the normal uterus, has a more rotund form, and is often nodular; furthermore, a minute handling of the mass frequently shows just a little play of motion between the uterine body and the tumor. The relation of the normal ovaries to the uterus also serves to mark out the uterine body. The uterine sound carried up on to the uterus gives the direction of the cavity at once, and shows whether it is in front of or behind the uterus.

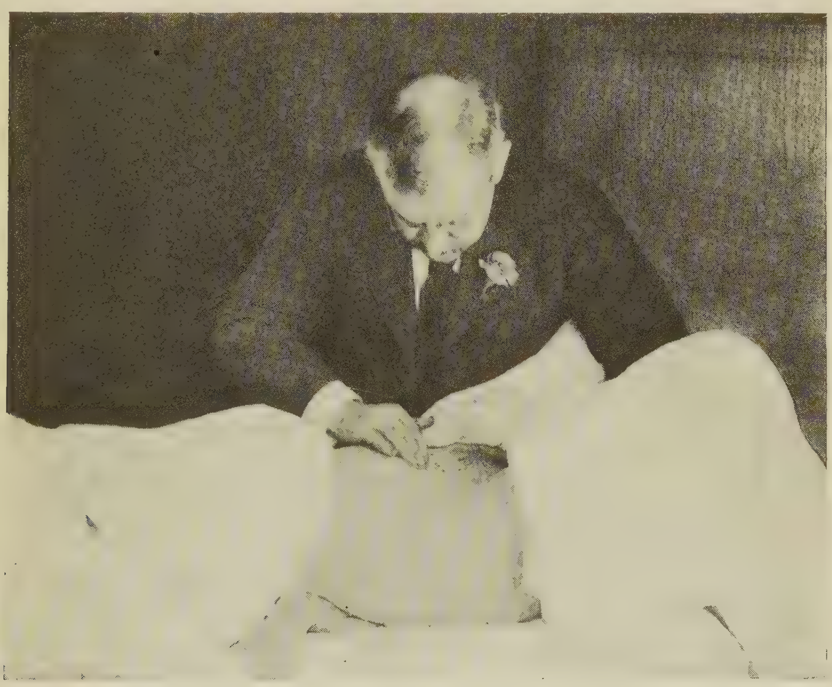

Fig. 12.—The Examiner is Engaged in Outlining the Enlarged Uterus or Other Pelvic Tumor. The outer limits of the tumor are marked out in a series of dots with the aniline pencil as seen in the figure.

An ovarian tumor (see Fig. 11) usually lies more or less lateral to the uterus, and is distinctly fluctuating, while there is also a well defined interval between the tumor and the womb. Palpation of the smaller structures about the tumor with careful attention sometimes reveals its connection with the uterus by the ovarian ligament. If the uterus is then caught with a

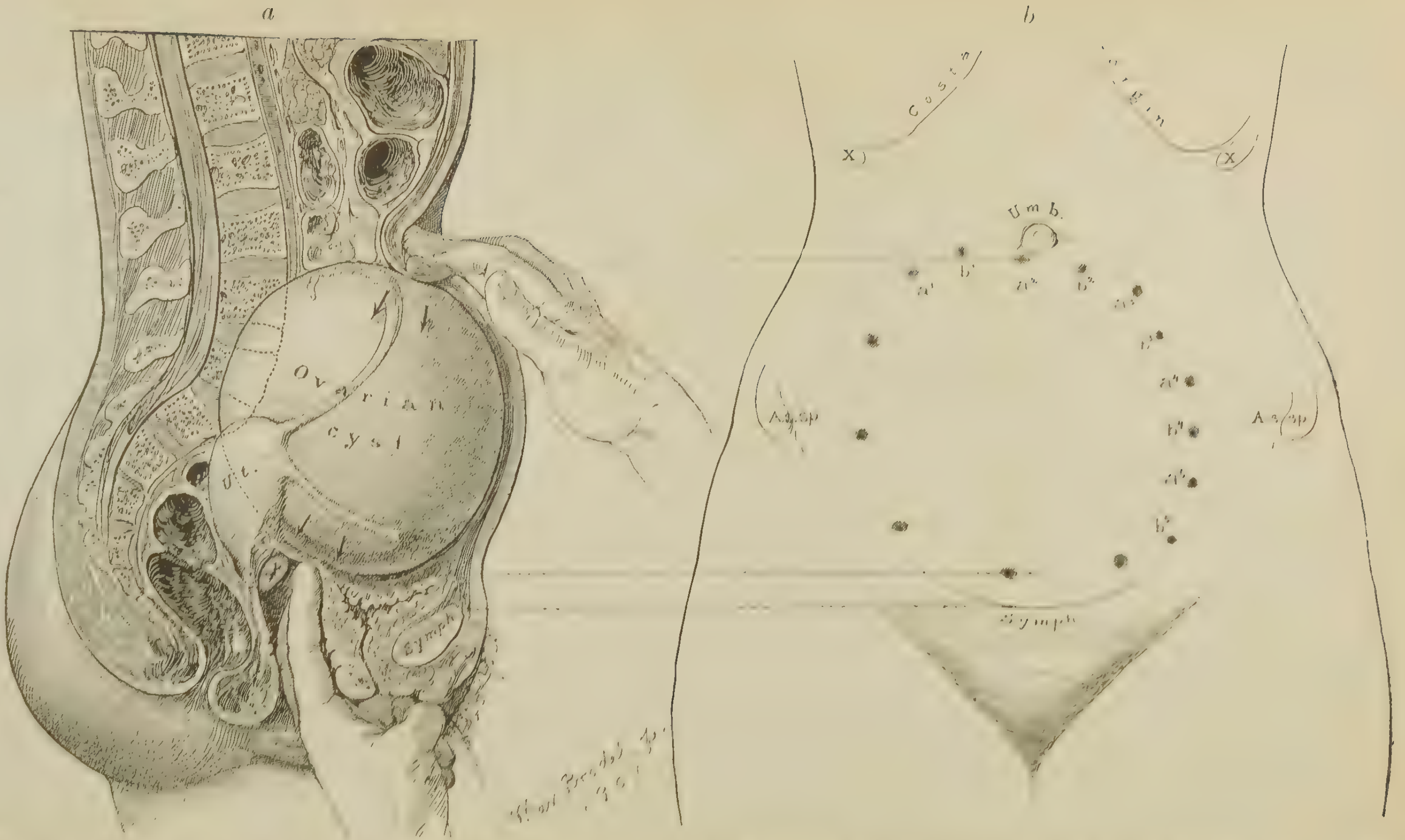

FIG. 13.—(*a*) PALPATING AN OVARIAN CYST SEEN IN SAGITTAL SECTION. The fingers of the left hand rest on the lower pole of the cyst, while the right hand is engaged in determining the limits of the tumor as felt through the abdominal wall. By a succession of short, rapid strokes with the fingers, a sort of vibrating thrill is communicated to the tumor and felt by the vaginal finger. This is a much more delicate way of outlining a mass than by the usual method of palpation. The rapid succession movement is illustrated by the diagram by making several fingers appear in the place of one. (*b*) The tumor is first mapped out with an aniline pencil or the skin sprayed with alcohol, at points an inch or more apart, a^1, a^2, a^3, etc. Then a series of further markings are placed between each of these at b^1, b^2, b^3, etc. After this the lines may be connected.

tenaculum forceps and pulled down towards the vaginal outlet, there is at first an indistinct movement on the part of the uterus, followed by a more tardy communicated movement on the part of the tumor. If the tumor is pushed upward in the direction of the umbilicus, the uterus, as a rule, does not follow it at once. An additional point in favor of an ovarian tumor is the discovery of a normal ovary on one side, while on the opposite side the ovary cannot be felt, its place being taken by a cystic tumor.

Gauze Records of Abdominal Tumors and Displaced Viscera.—I have found the method about to be described of the utmost value in making permanent records of my cases of abdominal tumors and misplaced organs, such as stomach and kidneys; and it is one I would earnestly recommend to practitioners at large, who can easily, with a little practice, acquire the slight degree of skill necessary to make the tracings. There are several reasons why this method of studying cases is important. In the first place, it is conducive to a more careful examination and palpation of the tumor. It requires more time than an ordinary investigation and therefore is of advantage to both operator and patient. Again, the deliberation necessary is justly calculated to impress the patient with the fact that the examination is being made with that extreme care and painstaking attention to the more minute as well as the large features of the case which a grave situation demands. The first step is to make an outline of the tumor by means of a series of dots on the surface of the skin with an aniline pencil, while the bimanual examination is being made (see Fig. 12). If the marks are not easily made on the skin, it will be sufficient to wet the surface with a little alcohol. By giving the fingers a little vibratory movement, as shown on the left hand in Figure 13*a*, the outlines of the cyst or tumor are more delicately appreciated, since each slightest thrill is communicated to the vaginal fingers resting on the lower pole of the growth. After

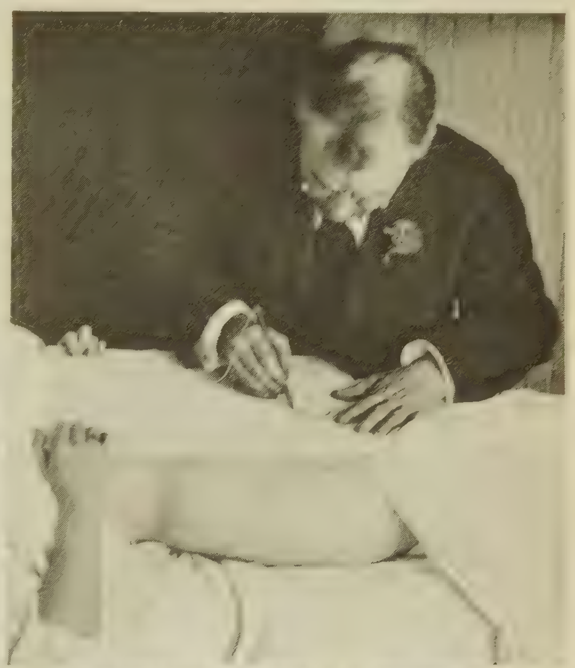

Fig. 13.—After the Examiner has Outlined the Tumor on the Skin in Aniline and has Marked Out such Landmarks as the Anterior Superior Spine, the Symphysis and the Margin of the Ribs, He then Lays a Gauze Pad on the Abdomen, Covering with the Transparent Material, on which He Reproduces the Markings on the Skin, easily seen through the Gauze. A crayon or carbon pencil is better for this purpose than an aniline pencil.

the tumor has been dotted out in outline and the dots have been connected by a continuous line, the landmarks of the abdomen, as the symphysis, the anterior superior spine, and the margins of the ribs are outlined with aniline (see Fig. 13*b*). The next step is to make a transfer of the record on the abdomen to a piece of stiffened gauze material (suisse, nainsook, or organdie) laid over the abdomen upon a glass plate as shown in Figure 14. The skin markings are all visible through the glass, and it is an easy matter to reproduce them

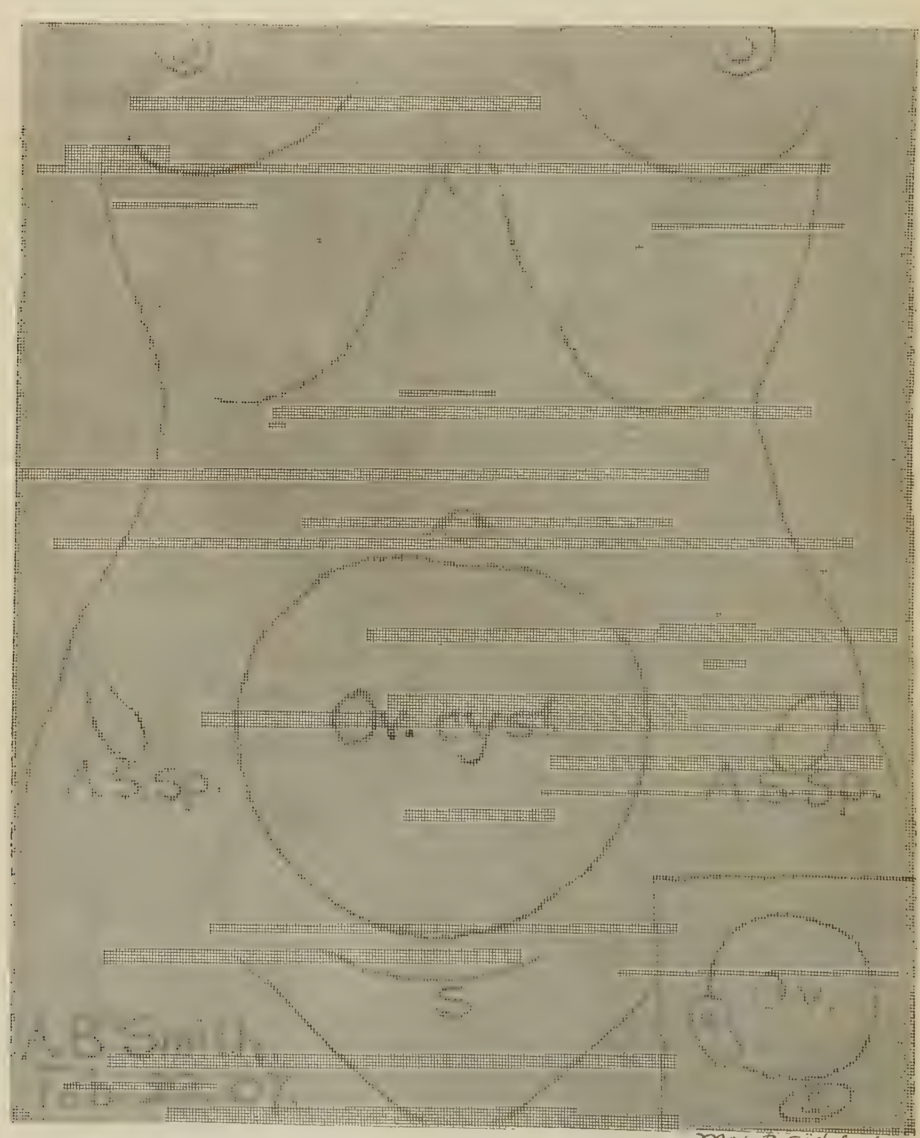

FIG. 15.—SHOWS A PERMANENT RECORD OF AN OVARIAN CYST AND THE OUTLINES OF THE ABDOMEN. The little figure in the lower right-hand corner shows the relation of the uterus to the tumor, the symphysis lies below.

with a crayon pencil as they are projected upon the gauze, which is carefully held immovable while the transfer is made. The appearance of such a gauze record is shown in Figure 15.

The record is then filed away to serve as a literal transcript of the case in lieu of an ordinary diagrammatic sketch, or for future comparison, in case the patient returns at a subsequent time and it is important to know whether the tumor has grown or not.

In using the record to test the growth or change in position of the tumor, an entirely fresh record should be made at the second visit, independently of the first one. Then the two gauzes should be laid one on the other, when any difference in size is easily appreciated.

For the sake of demonstration I give a photographic copy of the gauze record of a fibroid tumor (see Fig. 16). I have a large number of these records which not only serve the purposes indicated, but are most valuable in teaching as well.

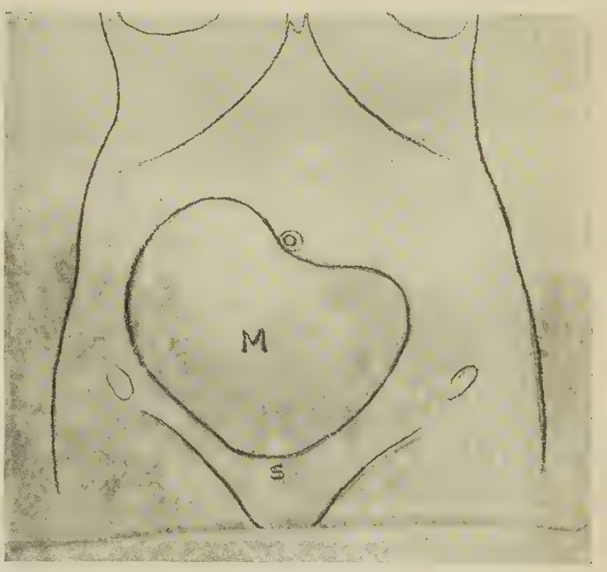

Fig. 16.—A Photographic Copy of a Gauze Tracing made in the Case of a Large Fibroid Tumor of the Uterus. The name and clinical data attached to the corner are omitted.

Inspection.—The examiner next proceeds to inspect the vulva, the vagina, and the cervix. A broken down or gaping vulvar orifice is often a most conspicuous object. The vulvovaginal glands (Bartholin's glands) should be examined, as they are sometimes the seat of chronic gonorrheal infection. By squeezing the external urethral orifice, a lingering infection at that point is brought to light in the form of a little drop of pus exuding onto the surface. A cystocele and a rectocele are formed by the walls of an everting vagina, associated with a descent of the uterus. The upper vagina and the cervix can sometimes be seen in these cases by simply pulling back the perineum with two fingers. For making a specular examination of the vagina, I like best on the whole a trivalve speculum (Nelson's). This is easily introduced by drawing back the posterior wall of the vagina with one or two fingers, at the same time slipping the well-oiled blade into the vagina, pressing a little backward so as not to impinge upon the urethra or strike the pubic arch. The position of the cervix having been located by the finger, the end of the speculum is directed downward and backward, so that when it is opened, the cervix lies plainly in view between the three blades (see Fig. 17). The color of the vagina is noted, and any discharges found are spread out on a slide for microscopic examination. When there is much leucorrhea, a large infiltrated cervix is often found pouring out a tenacious, muco-purulent material (endocervicitis). This is the common sign of a chronic gonorrheal infection, or of a simple chronic cervical infection following childbirth. The condition is not a sign of endometritis farther up.

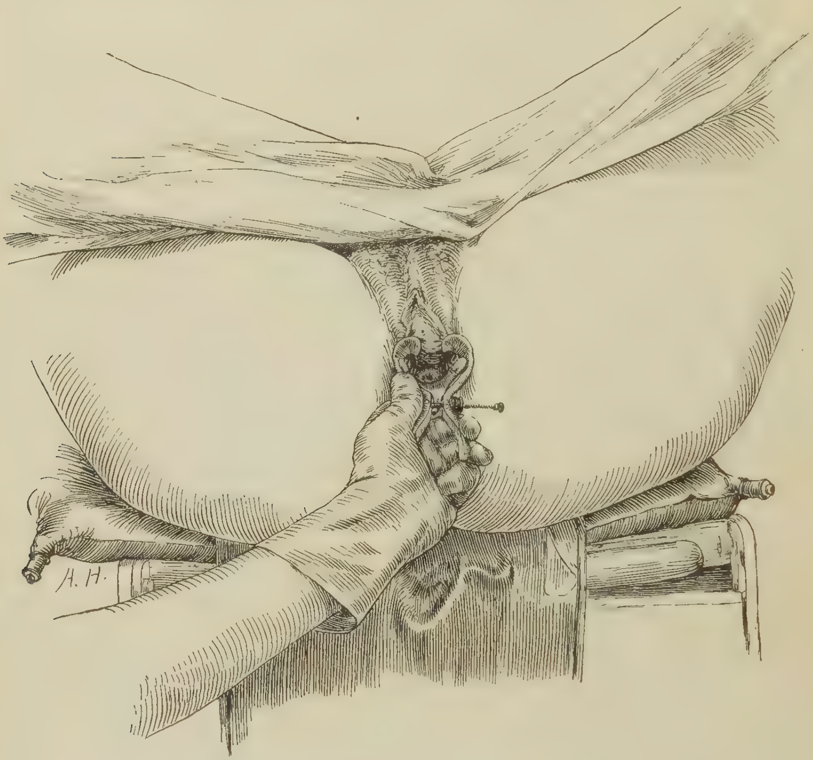

FIG. 17.—EXPOSING THE CERVIX UTERI AND THE VAULT OF THE VAGINA THROUGH THE NELSON SPECULUM.

Leucorrhea.—When a patient complains of leucorrhea, it is always important to determine the source of the discharge. As a rule, it is either vaginal or cervical. Cervical discharges may come from the mucous lining of the cervical canal from the external up to the internal os. A discharge from the uterine cavity (endometritis) is rare; I declare this in direct opposition to the commonly received opinion. The vaginal is readily distinguished from the cervical discharge by its more milky, thin, and uniform consistency; in pregnancy it may be of a curdy character. The cervical discharges, on the other hand, are always stringy, mucoid, or muco-purulent. In a doubtful case it is sometimes a good plan, after cleaning out the vagina, to prove the source of the vaginal discharge by placing a tampon in the vagina, adjusting it carefully to the cervix and vaginal vault. The patient should then keep quiet for a few hours, when the tampon is carefully removed and inspected. If the discharge is vaginal, the whole tampon is wet; if it is cervical, the accumulation is more in a little pool in the depression made by the cervix (Schultze's method).

I hear a great deal in correspondence with physicians in different parts of the country and from patients who come for treatment, of "ulcerations" and "erosions of the womb." To most women, "ulceration" is a grave, well nigh incurable malady, accountable for all sorts of lower abdominal aches and pains and general ill health. It is important to call the attention of the profession to the fact that ulceration of the neck of the womb is an extremely rare ailment, which not one physician in five hundred has ever seen. The condition called ulceration is, as a rule, an ectropion of the cervix, commonly associated with laceration. It does not demand treatment, unless there is at the same time an infection of the glands causing the discharge of a mucopurulent secretion. Anything causing congestion of the cervix, or a swelling up of its mucosa, will cause the cervical mucosa to roll out into the vaginal

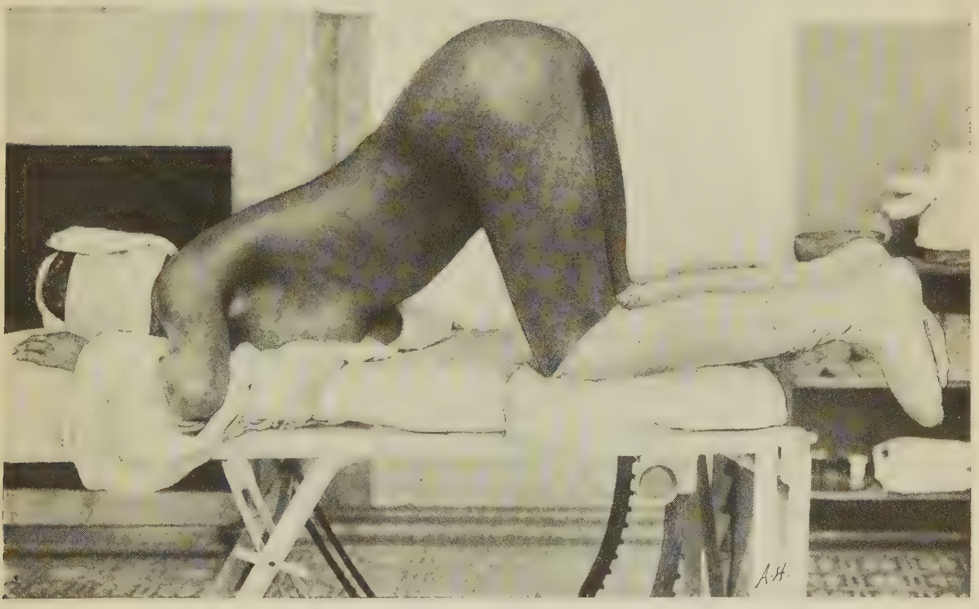

FIG. 18.—THE KNEE-BREAST POSTURE, GIVING A PERFECT EXPOSURE IN EXAMINING ANY OF THE HOLLOW PELVIC VISCERA, THE RECTUM, THE VAGINA, OR THE BLADDER. Note the approximation of the chest to the table, the spreading out of the elbows, and the direction of the face to one side, as well as the slight incurvation of the back. The patient should be at rest and feel well supported in this posture. Most cases do well with the thighs at an angle of about 65 degrees to the body as shown here in the figure. In other cases a better exposure is secured when the thighs are vertical and the angle is about 50 degrees, while in a few others still the relaxation is best when the thighs are drawn up a little under the abdomen and the angle is about 40 degrees.

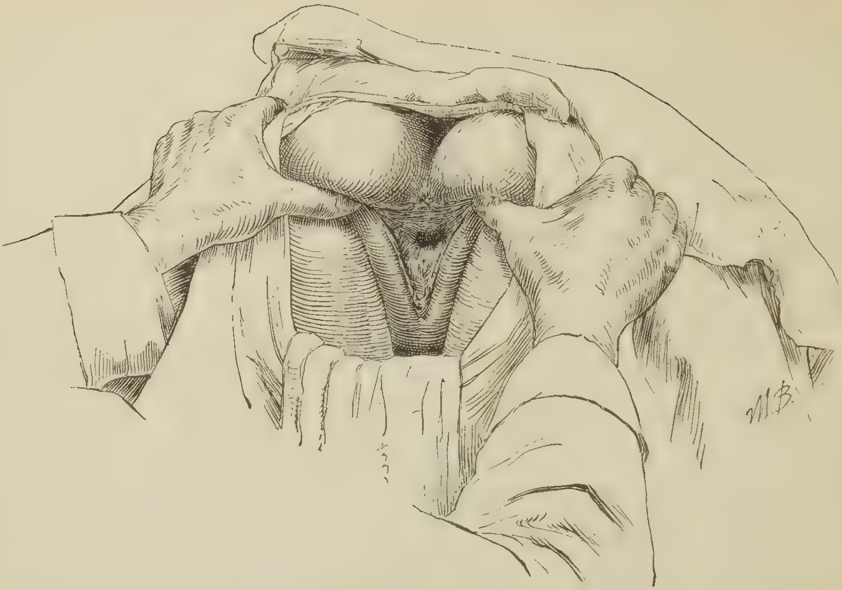

Fig. 19.—Examination in Knee-breast Posture showing Method of Lifting up Gluteals and Posterior Vaginal Wall thus Letting Air into the Vagina for the Introduction of the Speculum or the Examination of the Bladder.

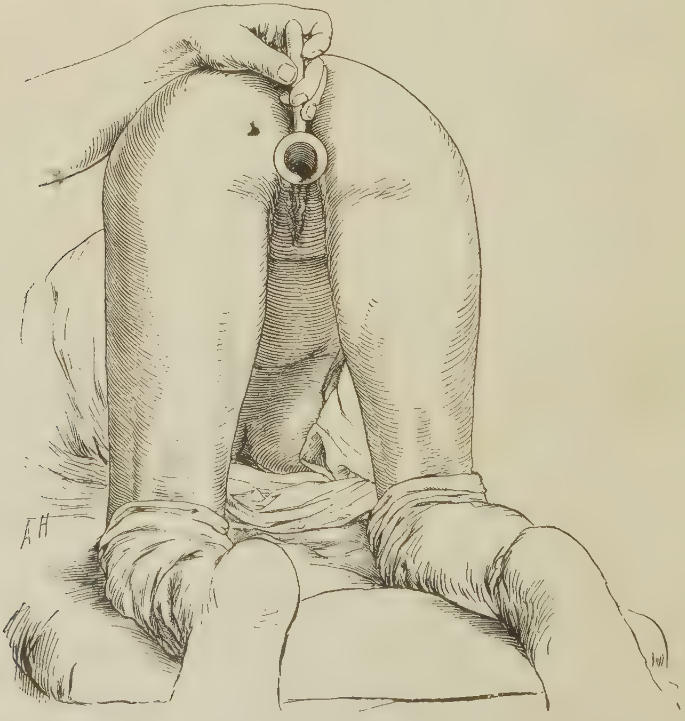

Fig. 20.—Examination of the Vagina, Vaginal Vault, and Cervix in the Knee-breast Posture with the Kelly Cylindrical Metal Speculum having a Stout Handle.

surface, where it appears as a dark red spot surrounding the os; but this is not a laceration or an erosion. Treatment of this condition, as a rule, is misapplied.

Examination in the Knee-breast Position.—An examination in the knee-breast position (see Fig. 18) is often of the utmost service in exposing every part of the vagina, with the cervix, to view. This posture is of the greatest utility in applying treatments to the inflamed vaginal walls, as the rugæ are thus all smoothed out and the vagina appears as a broad, smooth surface. A good way to let air into the vagina before introducing the speculum is shown in Figure 19. The examination is then best made by means of the writer's cylindrical metal speculum, with a large handle, as shown in Figure 20, which exposes every part and protects the vulvar orifice when treatments are given.

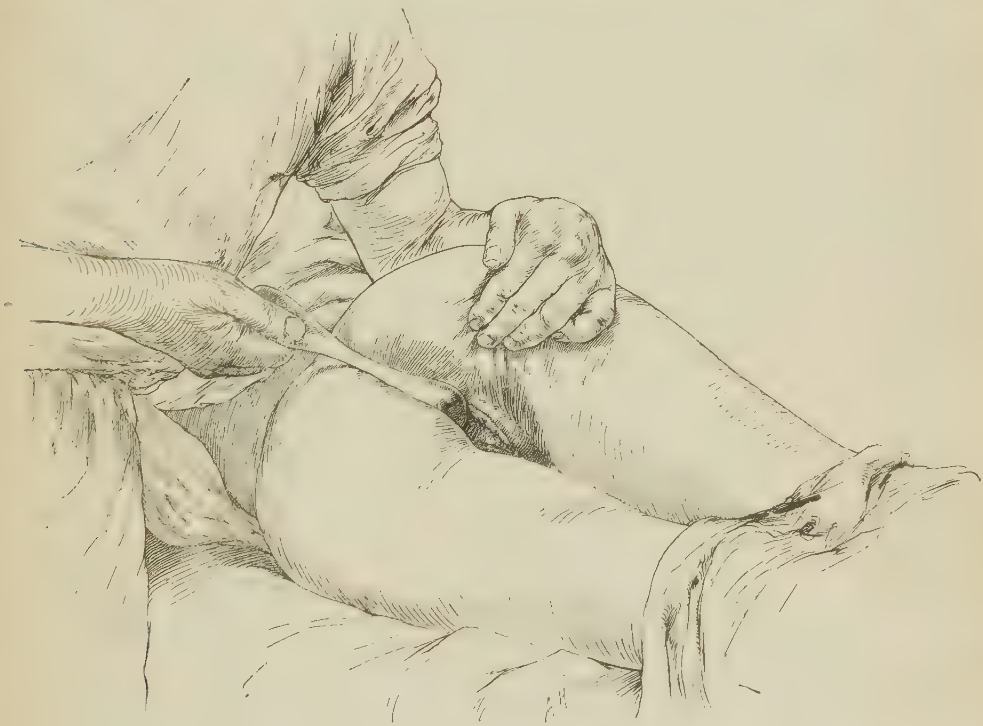

FIG. 21.—EXAMINING THE VAGINA IN THE LEFT LATERAL POSITION. The upper buttock is raised and the speculum slipped into the vagina. The posterior wall is then retracted so as to expose the interior.

The **Sims' position** (see Figs. 21 and 22) is one in which the patient lies semi-prone, with the right leg drawn a little above the left, and with the left arm behind the back or hanging over the edge of the table. The posture assumed is one in which, if the abdomen were opened, the pelvic viscera would be poured out onto the table. The pelvis must be so disposed at the edges of

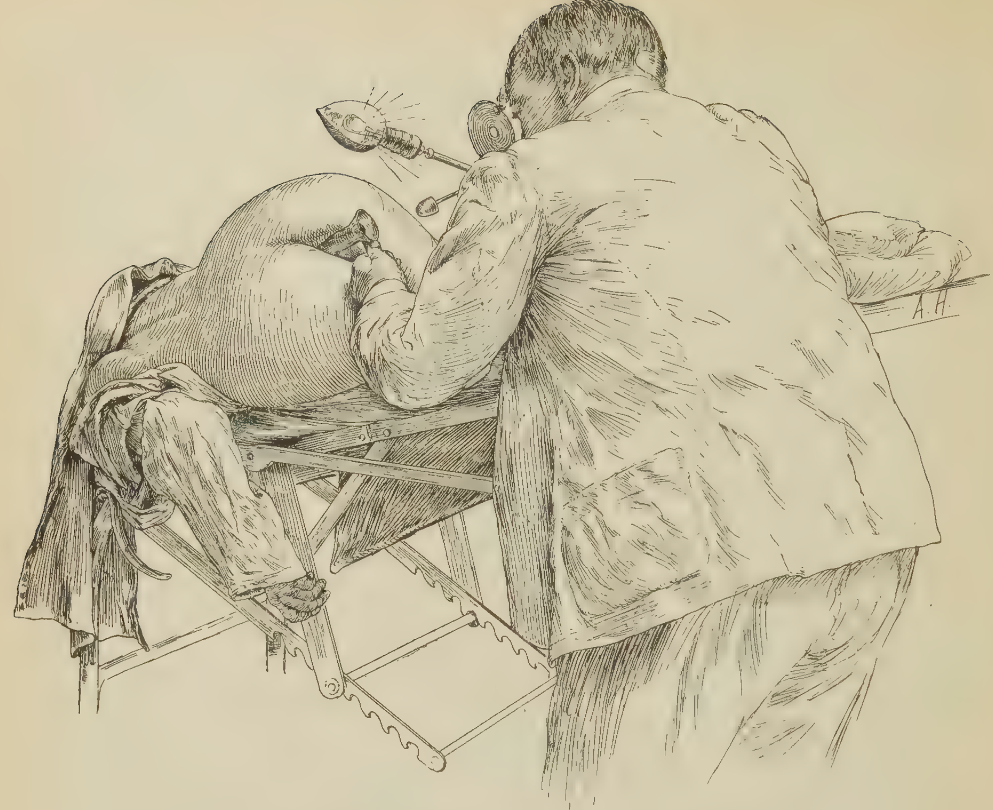

Fig. 22.—Introducing a Cylindrical Metal Speculum with a Stout Handle for Examination and Treatments in the Sims' Posture.

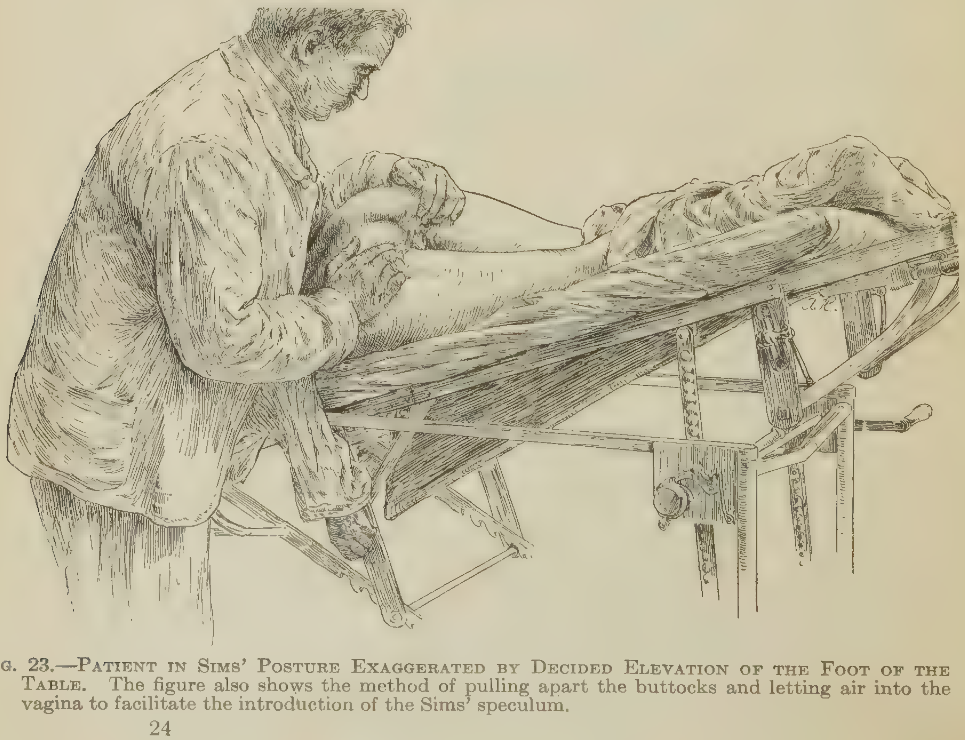

Fig. 23.—Patient in Sims' Posture Exaggerated by Decided Elevation of the Foot of the Table. The figure also shows the method of pulling apart the buttocks and letting air into the vagina to facilitate the introduction of the Sims' speculum.

the table as to afford a convenient view of the parts when the speculum is inserted, with the perineum retracted and the vagina ballooned out with air. If the table is elevated as shown in Figure 23, the distention of the vagina is greater and a better view is often afforded.

Examination in Children.—The examination of a child suffering from a vaginitis is always easiest to make in the knee-breast position, as it causes no pain, and affords a perfect exposure of the entire vagina and the cervix, impossible by any other method (see Fig. 18). To make the examination entirely painless, the nurse should slip a little pledget of cotton attached to a thread saturated with a ten per cent solution of cocain just inside the hymen. Then after five to ten minutes the little patient is put in the knee-breast posture and the cotton removed, when the vesical speculum No. 10 is introduced and the vagina at once balloons out and can be seen in all its parts by a reflected light. It is usually easy, without the knowledge of the child, to apply a thorough treatment, say a five to ten per cent solution of nitrate of silver, to all parts of its walls, or to insert a small medicated tampon, saturated with, say, thirty per cent to fifty per cent solution of argyrol, attached to a fine thread, by which it can be withdrawn in six to twelve hours.

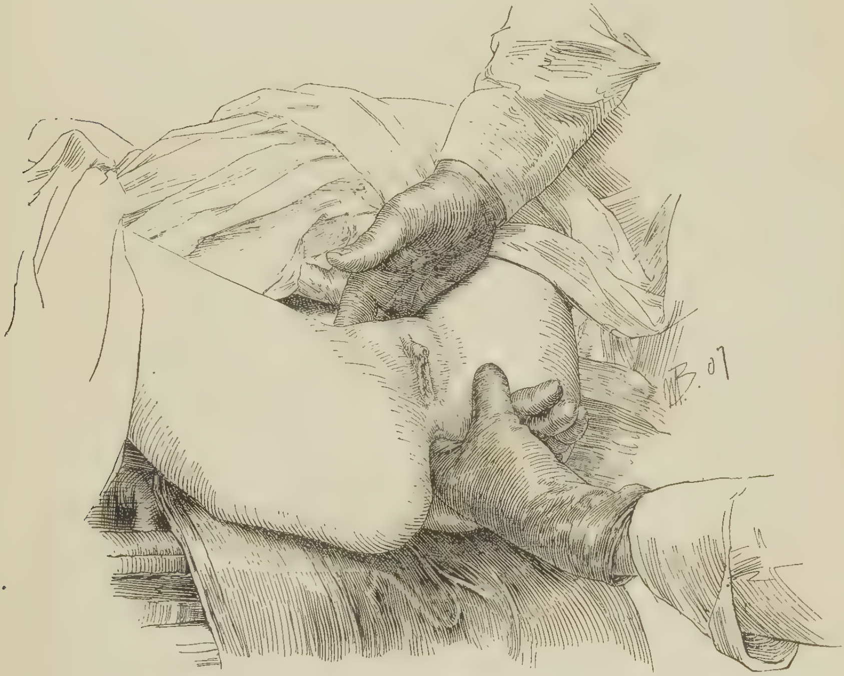

Fig. 24.—The Examination of a Child about Six Years Old, showing the Facility with which the Entire Pelvis can be Palpated by a Bimanual Rectal and Abdominal Examination, Owing to the Relatively Large Size of the Examining Hand.

When it is necessary to make a careful examination of the pelvic organs in a child, it is always best to do so at one sitting and to make the examination thorough by giving an anesthetic. A few drops of chloroform is all that may be necessary to relax the little patient completely. The examination should be made as shown in Figure 24, through the rectum and lower abdomen, and never through the vagina. The extreme simplicity as well as the facility of such a bimanual recto-abdominal examination is readily appreciated upon noting that the hands of an adult are relatively much larger in proportion to the pelvis of a child than to that of an adult. For this reason the pelvic organs in a child are all easily within reach of the bimanual touch.

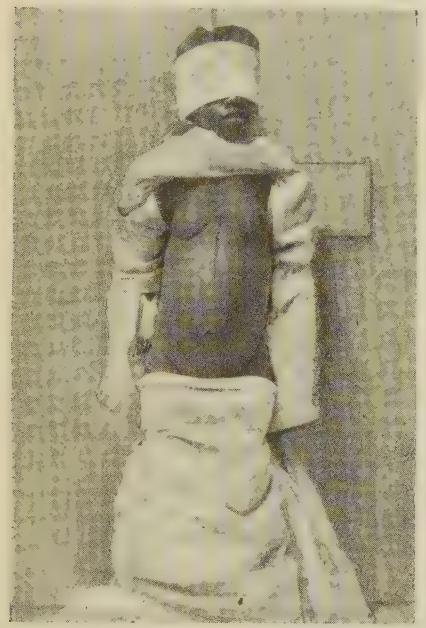

Fig. 25.—A Case of Tubercular Peritonitis in a Colored Child about Nine Years of Age. Note the rotund, ovoid, distended abdomen manifestly due to an accumulation of fluid in a child not too ill to be about.

When an ovarian tumor is found in a child, it is usually sarcomatous and demands careful handling on account of its friability, as well as prompt removal on account of its liability to become disseminated. A large ascitic accumulation in a child (see Fig. 25), in the absence of any other evidence of grave disease, is apt to be tubercular, especially in the colored race. A large tumor springing from one side and more or less filling the pelvic abdomen, is soft and fluctuating, but not within the peritoneal cavity, is generally a sarcoma of the kidney. Such tumors have been observed in children of very tender years.

Examination Standing.—It is important, where the patient has a descensus, or other displacement of the pelvic organs, to examine her in the erect posture, as she stands before the examiner with one foot on a low stool. In this way marked differences between the organs in the dorsal and in the vertical position are often found.

Examination under Anesthesia.—It often happens that the ordinary digital and bimanual examination leaves a doubt as to the condition of the deeper pelvic organs, the position and condition of the body of the womb, the uterine tubes, and of the ovaries. Under these circumstances it is always best to request a more complete and a deeper examination, with the patient completely relaxed by an anesthetic. By this means entire relaxation is secured, and the resistance which the patient often cannot control on account of pain, is done away with; while at the same time, the uterus itself can, under anesthesia, be drawn well down to the vulva and so made much more accessible to touch. Before making an examination under anesthesia, the bowels should be well opened, and the stomach empty. It is a good rule to have the patient rest a day or two afterwards. The best anesthetic for such a purpose is nitrous oxide gas. The gas can be given and the examination made within three to five minutes; consciousness follows at once, and there is no distressing nausea or depression afterwards. Sometimes after starting the gas, the patient is stertorous and does not relax; a few whiffs of ether combined with the gas then serve to produce entire relaxation, after which the gas alone is continued. It is possible, if it is necessary, for a patient to get up within a few minutes after such an examination and go home.

Examination of Virgins.—Young unmarried women ought, for decency's sake, always to be examined for the first time under an anesthetic; in this way their feelings are spared the shock and the distressing ordeal, and the examination made is complete and satisfactory, an exception under such circumstances without an anesthetic. It is always well to secure permission at the same time, if only a slight operation is required, such as a dilatation for dysmenorrhea, to proceed with it at once, to avoid giving an anesthetic again.

The empty rectum is the one important avenue of approach in making a deep investigation under an anesthetic. The finger should be carried well above the cervix uteri, through the valves, until the posterior surface of the uterus and of the left broad ligament are plainly felt. Too much force must not be used in palpating; I have known several instances in which the rectal wall has been perforated by an examining finger, compelling the examiner to suddenly and unwillingly turn surgeon, open the abdomen, and sew up the rent.

Pain.—When a patient comes with a complaint of a definitely located pain it is most important for the physician, in the course of his examination, to discover which organ is causing the suffering and then, by gentle pressure or manipulations, to try to reproduce the pain so that the patient may feel convinced that the source of her discomfort has been located, for if she can declare with conviction that the pain aroused is exactly the same pain, felt in the same spot, he will secure her hearty coöperation in following any rational plan for her relief. Patients sometimes complain of pain in the pelvis, when a careful examination shows that no abnormality can be detected in any organ. Here, as a rule, the pain is complained of whenever any part of the pelvic peritoneum or any pelvic organ is squeezed slightly between the fingers of the two hands. If this fact is carefully noted and remembered, many unnecessary, often mutilating operations will be avoided. When intermittent attacks of pain are complained of, unless the examiner can distinctly reproduce the pain or touch the very spot, the patient ought to be kept under observation until a typical attack comes on. The physician should be called, by day or night, to make a careful investigation as to the exact character of the attack and the site of the sensitiveness. If he has had much experience, he will very often be able to say at once "the attack is one of renal colic," or "it is undoubtedly due to gall stones," etc.

The right side of the abdomen is peculiar in that we find there a chain of at least five organs, beginning at the margin of the ribs and extending down to the pelvic floor, and some of the morbid conditions affecting these organs are liable to be mistaken one for another. These organs are: the gall bladder, the right kidney, the cecum, the vermiform appendix, and the right uterine tube and ovary (see Fig. 26). It might at first sight seem impossible that anyone familiar with abdominal diseases could mistake a disease in such an organ as the gall bladder, for instance, at the upper end of the chain for a disease of the tube and the ovary at its lower end. Such mistakes have occurred, however, and that in the hands of some of our best diagnosticians. The physician who would avoid errors of this kind must not only familiarize himself with the signs belonging to the diseases characteristic of each of these organs, he must also, in every case where anyone of them appears to be affected, examine the other organs as well. The cases which most frequently give rise to mistakes are those of more or less vague, but persistent pain in the right part of the abdomen, whether in the loin, or anteriorly, or extending down in the direction of the pelvis, or in the back below the crest of the ilium. These sufferers may go the rounds for many years with no more definite complaint than a vague but very real unrest, which the patient attributes without doubt to "something wrong in her right side," until some one is found with sufficient skill to determine which link in the chain is at fault. My own experience has shown me that over

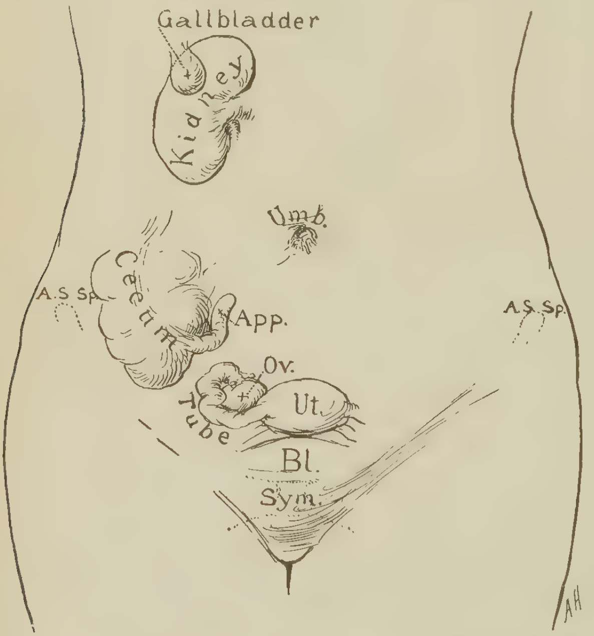

Fig. 26.—Shows the Organs on the Right Side whose Affections are Liable to be Confused One with Another. By careful rectal palpation the ovary and uterine tubes are felt; by careful palpation in the right iliac fossa a diseased appendix can be reached; and the right kidney can be examined with unerring certainty by injecting its pelvis through the ureter.

sixty per cent of these cases of ill defined right-sided pain are due to some trouble in the kidney, usually a displacement, with a kinking of the ureter, and retention of urine in the renal pelvis.

It is an easy matter for anyone experienced in catheterizing the ureters to pass a renal catheter up into the right kidney, inject fluid into the pelvis, and thus bring on a mild attack of renal colic. The patient, as a rule, will at once identify the pain thus induced, with the pain from which she has been suffering, both as to situation and character. The catheter which is passed up the ureter for the purpose of injecting the kidney, if tipped with wax, may show scratch marks when examined under a lens of low magnifying power, revealing the presence of a stone in either the pelvis of the kidney or the ureter (see Fig. 27).

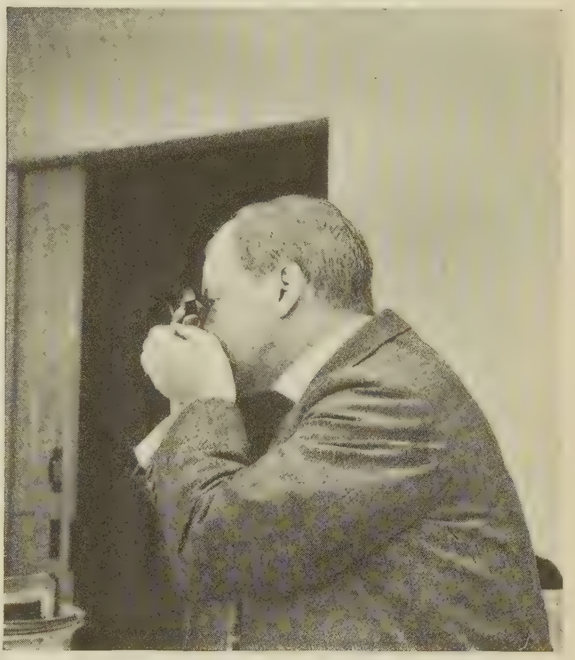

Fig. 27.—Examining a Ureteral Catheter that has been Wax-tipped and Passed through the Bladder up into the Pelvis of the Kidney and Carefully Withdrawn. The examiner is using a lens and holding the catheter so that the light strikes the uppermost glistening surface as he turns the catheter between thumb and forefinger, while looking for the gouges or scratch marks indicative of the presence of a stone in the upper urinary tract.

Backache.—The most serious mistakes and the gravest disappointments often result from operative procedures correcting retro-displacements of the uterus, done in the hope of relieving a backache. As a matter of fact, the backache so common in women is rarely due to a displacement; it is either an affection *per se* and purely local, or it is dependent upon an anemia and a general condition of ill health (neurasthenia). From backache to uterus in women, and backache to kidneys in men, is a fallacious mode of reasoning. When the pain is situated very low down in the back, the coccyx should be examined carefully bimanually, with one finger in the rectum. Occasionally, a well localized, severe pain in the coccyx is relieved by the extirpation of the structure, but, as a rule, coccygeal operations are failures and are greatly overdone, to the discredit of surgery (see Chap. IX).

Notes of Examination.—The notes of the examination should always be carefully compared with the complaints of the patient, which ought, as a rule, to be written down in her own characteristic words; if the anatomical findings do not tally with the statements made by the sufferer, or afford a reasonable explanation of the complaints, the examiner should not rest satisfied until he has made a further and more searching investigation and perhaps discovered the cause for the discrepancy between the subjective sensation and the objective findings. When the patient comes complaining of pain, and the examiner finds a displacement of some sort, he should be very cautious about promising that the correction of the displacement will serve to relieve the pain. It will be safer to promise nothing more than a good mechanical result from the operation, while expressing the reasonable hope that the discomfort will be relieved.

GENERAL PRINCIPLES OF TREATMENT.

Outlining a Course of Treatment.—With the statements of the patient clearly borne in mind, and with the patient before him and fresh from the examination, the gynecologist should be prepared at once to outline a course of treatment. Whenever there is a lingering uncertainty as to the condition, a tentative course may be tried with a view of proceeding, if necessary, at a later date, to more radical procedures. It is my custom in puzzling cases to note all the facts ascertained and then to add a list of the doubtful matters still to be determined.

In general, the lines of treatment are:

(1) General, hygienic.
(2) Palliative.
(3) Radical, by operation.

When in doubt it is best to proceed from the simpler to the more serious modes of treatment. Having outlined a scheme, the physician should stick to it until it is fairly tried, when he may be justified in assuming a more aggressive course.

If no local condition is discovered to account for the discomfort complained of, a general hygienic course may be adopted, extending over a period of some weeks or months.

Hygienic treatment involves these various factors:

Rest.—Early hours in retiring; breakfast in bed; rest an hour before and an hour after each meal, or lying down six half-hours in each day. A splendid rest may be obtained by regularly putting on a night-gown and going to bed for an hour to an hour and a half in the afternoon.

Food.—Simple, nourishing food, avoiding pastry, pickles, condiments, and fried articles. Some easily digested food between meals and before going to bed, such as a cup of milk, malted milk, gruel, or broth.

Exercise.—Some exercise must be taken every morning and afternoon, whether in walking, driving, working in a garden, or playing golf.

Medicine.—A bitter tonic such as Calisaya bark, or a pill of calumba and gentian, one grain each. Opium must never be given in any form to induce sleep. If it is necessary to give some sedative for a few nights in order to break the habit of sleeplessness, one of the milder hypnotics must be used (see Chap. VIII).

Massage.

Cold morning sponge.

Regular evacuations of the bowels.

Sunlight baths.

Often the mere assurance that there is nothing serious the matter will send the patient rejoicing on her way, ready to take plenty of exercise, to live in the open air, to take her food with relish, and to enter once more into natural home relationships. Such is the discipline of the mind over the feelings. I have many times seen a patient walk into my office the picture of woe, with all her functions disordered, because she has been told she had an incurable disease which rendered it necessary to remove her uterus, uterine tubes, and ovaries. Upon my assuring her that there was nothing whatever the matter with these organs, she has left my office radiant, a woman in perfect health.

Palliative treatments may be followed out while keeping a patient under observation.

Palliative treatments are applied by the vagina in the form of:

(1) Painting of the cervix and vagina.
(2) Applications of caustics to the cervix and the uterine cavity.
(3) Packs in the vagina.
(4) Douches in the vagina.
(5) Pessaries.

For painting the cervix and the vault of the vagina, a strong tincture of iodine (Churchill's) was largely in vogue a couple of decades ago. The nitrate of silver in strong solution, ten to forty per cent, may be used on the diseased cervical mucosa. In using any powerful solutions for treating the cervix or the glands within the cervical canal I commonly employ a cylindrical metal speculum with a stout handle like that shown in Figure 28. This serves to isolate the cervix and to protect the surrounding parts from the cauterizing effects of any of the drugs used. It is doubtful if uterine treatments for "endometritis" are not far more dangerous than useful. Many cases of salpingitis have been set up in this way. Packs support the uterus and provoke a watery discharge when glycerin is used. They do not do much to cure any disease. Douches as hot as can be borne often give much relief; just how far they are curative is doubtful. Pessaries are being more and more rarely used. They have a useful, but limited field. The question of their use is discussed in detail in Chapter XIII.

While undergoing a course of palliative treatment, vaginal packs consisting of cotton and wool tampons carrying boroglycerid, may be applied to the vagina and the cervix; hot water douches, as hot as can be borne comfortably, say 105°–115° F., continued for ten or fifteen minutes once or twice a day, are serviceable after removing the pack. The bowels should be kept unloaded by giving a flaxseed enema, made by boiling four tablespoonsful of the whole seeds in a quart of water for ten minutes, then straining and injecting the soothing mucilaginous fluid warm. Massage may be given to quicken the circulation and process of nutrition, cold or hot packs at night to induce rest, and a cold spinal douche in the morning.

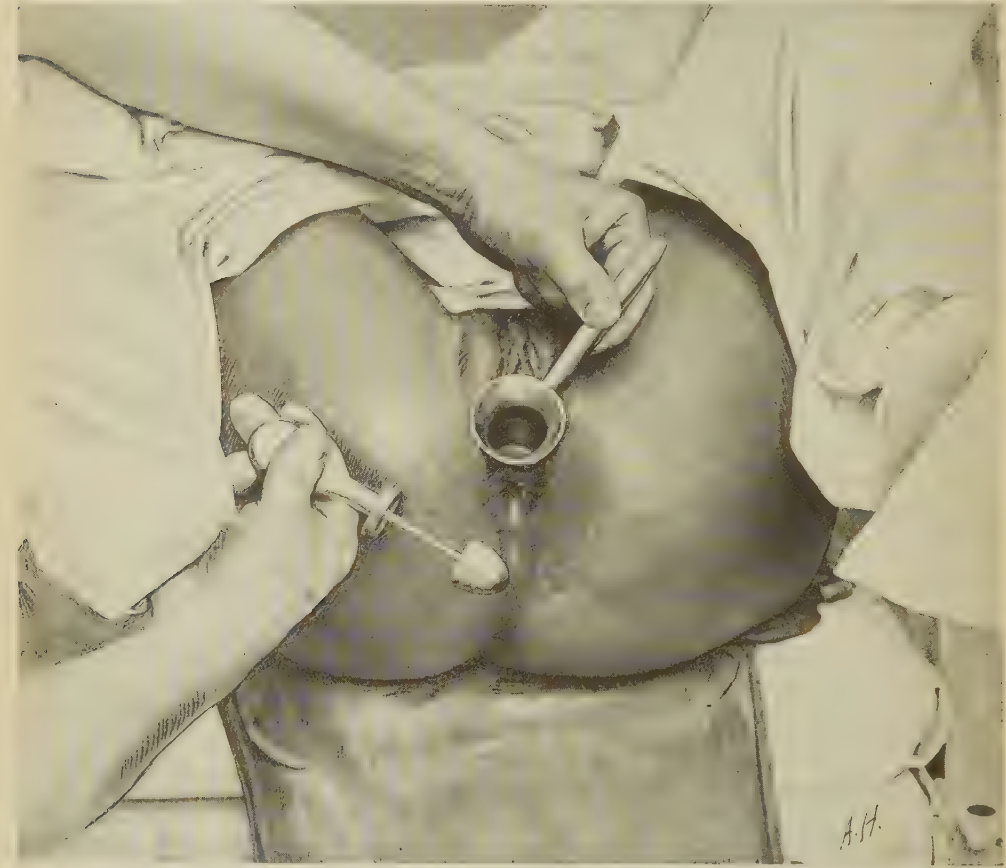

Fig. 28.—Examining the Cervix and Vault of the Vagina with Kelly's Cylindrical Metal Speculum with Stout Handle. This instrument is most convenient for exposing the cervix and protecting the rest of the vagina while treating the cervix with cautery, etc.

In deciding to do an operation, it is always most important to be sure that the operation will relieve the complaint. If a minor operation is suggested, such as the repair of a lacerated cervix, the physician should take great pains to determine that there is no other serious affection which he is likely to leave unrelieved. In my personal experience, the operation for laceration of the cervix is generally a most useless gynecological procedure, often unnecessarily performed. It is often recommended when the patient is in reality suffering from a uterine displacement associated with a broken down vaginal outlet, and sometimes even in the presence of a grave inflammatory trouble involving the uterine tubes.

EXAMINATION BY RECTUM.

The rectum, owing to its proximity to the other pelvic organs, and its frequent association with many of their diseases, is as much a part of the field of the gynecologist as are the organs lying in front of the vagina and uterus, namely the urethra and the bladder. The specialist or the general practitioner, who fails in his gynecological examinations to take the rectum constantly into account, will often in this way lose important opportunities to make a correct diagnosis. It is only necessary to recall the close anatomical connection of the rectum with the perineum, with the vagina, and with the cervix, as well as its constant contact with the body of the uterus and the left uterine tube and ovary, to realize that these claims are not exaggerated. The wonder is not that the rectum is so often involved, but that lying as it does, it does not more frequently enter, as an important complication, into a great variety of gynecological ailments. The rectum is of interest to the gynecologist in the following ways:

(1) It may itself be the cause of diseases of the pelvic structures, as when a carcinoma of the rectum extends to the vagina, or the uterus, or the pelvic peritoneum. The constant overloading of the rectum often causes stasis of the pelvic vessels, and either through this means or through the attendant toxemia, is a common cause of dysmenorrhea. In children, a form of pruritus is occasioned by the escape of thread worms from the rectum out onto the vulva.

(2) The rectum is liable to be affected in its turn by diseases of the pelvic organs; for example, it may be choked by a large uterine fibroid, if it is one large enough to choke the pelvis which has been caught under the promontory of the sacrum; or again it may be pressed upon by ovarian tumors; or its lumen may be invaded by pelvic abscesses.

Almost all cases of extensive pelvic, that is to say uterine tubal inflammatory disease, involve the rectum as well as the adjacent structures; extensive disease in the pelvic cellular tissue may choke the lumen of the bowel at the pelvic floor down to the size of the little finger. A vicious retroflexion may cause obstinate constipation, as in the earliest and now classical case observed by Köberle. Large pouting hemorrhoids may be only a sign of a blockade in the pelvic circulation, induced by inflammatory masses at mid pelvis. Further, we have but to recall the cases of complete septal tear, extending from the vagina into the bowel and rupturing one or both sphincters.

(3) Diseases of the rectum are sometimes mistaken for uterine or ovarian diseases. This error is a grave one, inasmuch as mutilating operations may be and have been performed on the innocent genital organs, when the disease actually lay within the rectum. Hemorrhoids produce a bearing down sensation, easily mistaken for the bearing down caused by a

displacement of the uterus; a cancer of the rectum, high up, has been repeatedly mistaken for a pelvic tumor of some other kind; and most important of all, a proctitis, with its pelvic distress and vague pains is commonly overlooked or mistaken for chronic disease of the ovaries and tubes. I recall also in this conection the cases so much talked about a generation ago, where a fissure of the rectum, causing pains reflected to other parts of the pelvis, was often mistaken for uterine or ovarian disease.

It is manifestly important for all these reasons that the gynecologist should include the rectum and its diseases within the scope of his inquiry in almost every case, and further that he should, if necessary, be ready to apply the appropriate treatment. I would lay great stress then upon the routine examination of the rectum. I have no doubt at all that in every hundred cases examined in this way by one who has newly taken up the subject, a number of surprising discoveries will be made.

The reason for the neglect of this field in the past has lain in the difficult and unsatisfactory character of the examinations, which elicited no positive information. Even recently, the method in vogue has been to investigate the diseases of the rectum situated above the anal margin with the index finger, which at best cannot do more than reveal a few of the gross changes. A distinguished proctologist and author of a large work on rectal diseases once declared at a large society meeting at St. Louis, that he had no interest in diseases of the rectum that did not manifest themselves to his educated touch! Concurrently with the finger examinations, various thin-bladed bivalve and trivalve specula were used, in the vain hope of seeing as well as feeling something; but these little instruments were in reality almost wholly useless, for they did little more than expose the sphincter area, and as much of the bowel above as might prolapse between the narrow blades of the speculum. It was with rectal diseases as with eye diseases a few decades ago, when the patient had either amblyopia or amaurosis; in amblyopia the patient saw nothing, but the physician saw something, while in amaurosis neither patient nor physician saw anything. Several men, such as Sims and J. G. Carpenter, had looked into the rectum, using a Sims' speculum in a Sims' or an elevated posture, but the action was incidental, and they never appreciated the value of the method enough to advertise it or insist upon its universal acceptance as the one method of the highest importance, and so fundamental and absolutely necessary in all satisfactory examinations and treatments of the rectum above the sphincters. No other person took particular note of their use of the Sims' speculum in this way and nothing was accomplished. One insuperable added difficulty was the want of a proper instrument to make a thorough investigation of the bowel, for the Sims' speculum is but a make-shift. I took up this subject in the eighties, while yet in Philadelphia, and in April, 1895, I published an article in the Annals of Surgery (vol. 21, p. 468), in which I insisted upon the importance as well as the entire feasibility of always examining the rectum in an elevated posture under air distention, using a long cylindrical speculum with a large handle, which I devised especially for this purpose.

Method of Examination (see Fig. 29).—A good single speculum for general use for this purpose is one fourteen centimetres long and twenty-two millimetres in diameter ($5\frac{1}{2} \times \frac{7}{8}$ in.). A serviceable long proctoscope is twenty centimetres long, and a sigmoidoscope may be used which is thirty centimetres in length or even more. The handle, from ten to thirteen centimetres in length, affords a strong grasp for the fist. The obturator of the speculum must not be pointed, nor yet too blunt. Aside from the speculum, the following instruments are needed: A head mirror to reflect an electric light, gaslight, lamplight, or daylight; a long pair of alligator forceps used in swabbing out the bowel. The bowel ought to be empty when the patient assumes the knee-breast posture, having laid aside all constricting articles of dress, espe-

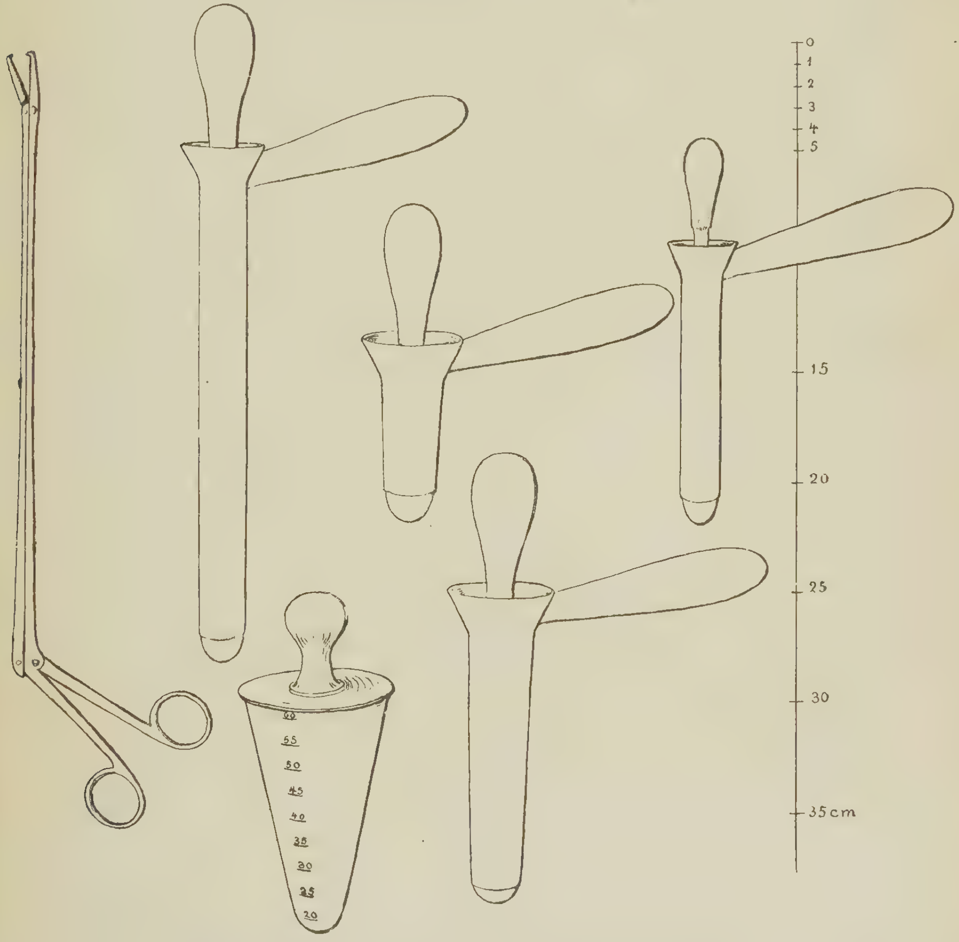

Fig. 29.—Rectal Instruments. Four specula of different sizes, a conical dilator for dilating the sphincter, and long alligator forceps for conveying cotton or gauze high up into the rectum.

cially corsets and articles likely to bind the chest and limit the tendency of the viscera to gravitate towards the diaphragm. The end of the speculum is now well oiled and introduced by thrusting it in a direction slightly downwards and into the pelvis through the anal orifice (see Fig. 30). A good way to effect its introduction is to push it a little way into the anus, and then quickly withdraw it, when the anal orifice at first contracts vigorously and then relaxes; now in the act of relaxation, the bowel is caught by surprise, as it were, and the speculum thrust quickly in before another contraction can take place. As soon as the speculum enters about two inches, its deeper introduction into the bowel beyond should be conducted under the guidance of the eye, looking down its lumen into the bowel (see Fig. 31). Only those who have a large experience in carrying the speculum into the upper bowel ought ever to make the attempt to push it on up the bowel without removing the obturator and watching each step in the advance. With the removal of the obturator, the air rushes in with a distinct suction sound and distends the rectal canal; at times it does so suddenly, at other times slowly step by step, until the air expansion reaches up to the hollow of the sacrum, to the promontory of the sacrum, and even beyond it into the sigmoid. I thought in my first efforts that I could look well up into the descending colon, where

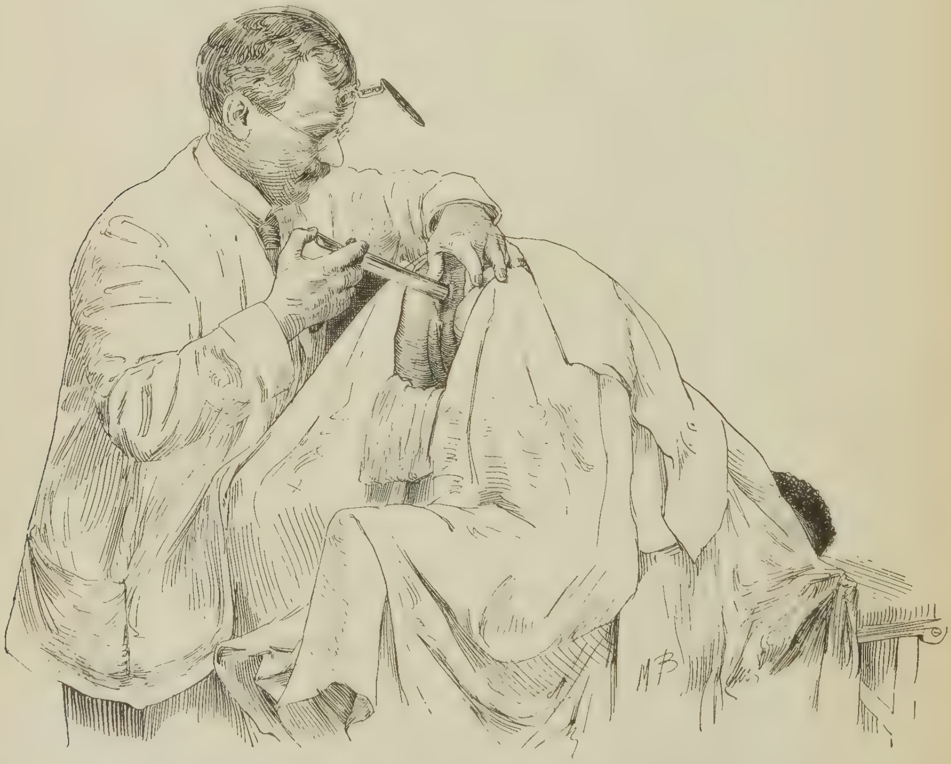

FIG. 30.—SHOWS THE METHOD OF INTRODUCING THE LONG RECTAL SPECULUM FOR THE PURPOSE OF EXAMINING THE ENTIRE LENGTH OF THE LOWER BOWEL.

I could feel the end of the speculum through the abdominal wall, apparently not far from the ribs. In this, however, I was misled, and I have not yet been able to use a colonoscope. As the light reflected by the head mirror is directed into the bowel, the ampulla is first seen and the sharp-edged overlapping valves which limit it just above on the right and the left. With the illumination properly directed, the examiner will easily keep the instrument well within the lumen of the bowel so as not to cut the mucosa, as he carries it successively higher and higher until the uppermost limit of expansion is reached. Oftentimes this upper limit is marked by a little puckered depression in the midst of a series of concentric folds. It is important not to mistake this normally contracted empty bowel for a stricture of the rectum or of the sigmoid. The soft margins of the normal lumen at this point can readily be examined with a metal instrument, a searcher, or a scoop, or by pushing up a large soft catheter. It is well, in the course of the examination, to notice and to touch the promontory and the hollow of the sacrum against which the distended bowel closely applies itself. As the instrument is gradually withdrawn, the character of the mucosa on all sides is noted, its natural redness, the vessels which course like streams and subdivide into lesser and lesser

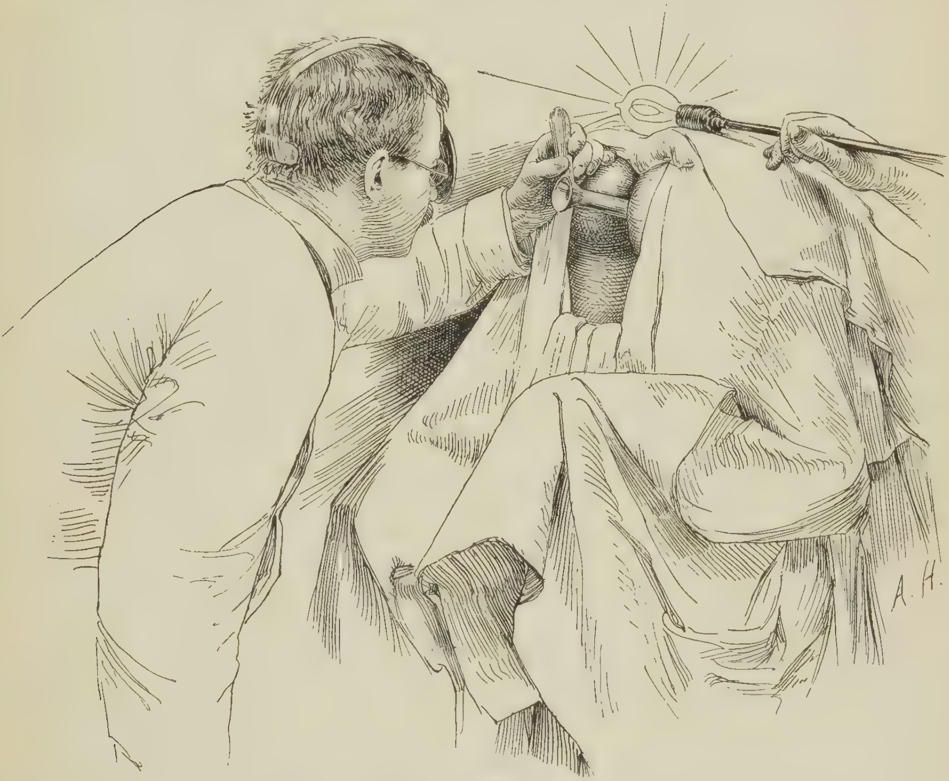

FIG. 31.—SHOWS THE INSPECTION OF THE BOWEL WITH A SIMPLE HEAD MIRROR USING A REFLECTED ELECTRIC LIGHT.

tributaries, sometimes tiny little points, the openings of glands are visible, the valves are each noted with particular care, they may be extensively overlapping, making the bowel tortuous, or have thickened, inflamed margins or be almost obliterated. The signs of rectal inflammation are evident in a diffuse haziness or velvety appearance of the mucosa, associated with the disappearance of the normal vascularization, and often, although the tissues bleed easily, no vessels at all can be seen; old inflammatory trouble often leaves behind patches of brownish discoloration seen mottling the mucosa everywhere; ulcers are always plainly visible; polyps are readily seen pendant in the lumen, and occasionally the ragged, bleeding, granulating surface of a carcinoma fills the lumen and forbids the further introduction of the speculum. When the bowel is strictured by syphilis, by tuberculosis, or by early cancer, one can often use a smaller speculum with advantage, one about twelve or fifteen millimetres in diameter. It is important in such cases, when it can be done without risk, to carry the speculum above the diseased area to discover the healthy bowel above, and so to determine the extent of the disease. For the examination of the hemorrhoidal region, a shorter speculum, four centimetres long, which I call a sphincteroscope, is of value. The mucosa of the bowel prolapses into this on withdrawing the obturator, and the hemorrhoids swell up. It is of an occasional advantage to have a sphincteroscope made with a fenestra on one side about two-fifths of an inch in diameter, cut through the entire length of the tube. This allows any diseased tissues within the sphincter area to drop into the lumen for examination and treatment. With the sphincteroscope one also sees fistules and fissures to better advantage.

Methods of Treatment of Rectal Diseases.—It does not lie within the scope of my undertaking to do more than to touch upon this important special branch, so closely allied to the gynecological field. The following are some of the general guiding principles: the bowel, which has been thoroughly evacuated beforehand, can be well cleansed with pledgets of cotton dipped in warm boric acid solution and introduced by means of the long alligator forceps (see Fig. 32). An application is in like manner readily made to ulcers by means of cotton pledgets, saturated with a two or a five per cent silver solution; this can be done with as much accuracy as in the treatment of a sore throat. Inflamed areas in the upper bowel can be treated by packing with gauze carrying a ten per cent ichthyol solution in water and glycerin. A cotton bolus makes a good pack too. These packs thus applied to the upper bowel, or to the whole bowel from the sigmoid down, can be left in place until they are passed in the course of nature by the patient.

When malignant disease is discovered, it is easy with a pair of cutting sharp-edged forceps, with short jaws working like alligator forceps, to remove a piece of the tissue for microscopic examination.

In the treatment of fissure, it is sufficient to give the patient enough gas to make her unconscious, and to use the conical dilator (see Fig. 29, p. 35), so as to thoroughly overstretch the sphincter area until the tips of five fingers can be introduced. This can also be done with two Sims' specula, one a little narrower than the other, introduced together and then separated widely, also

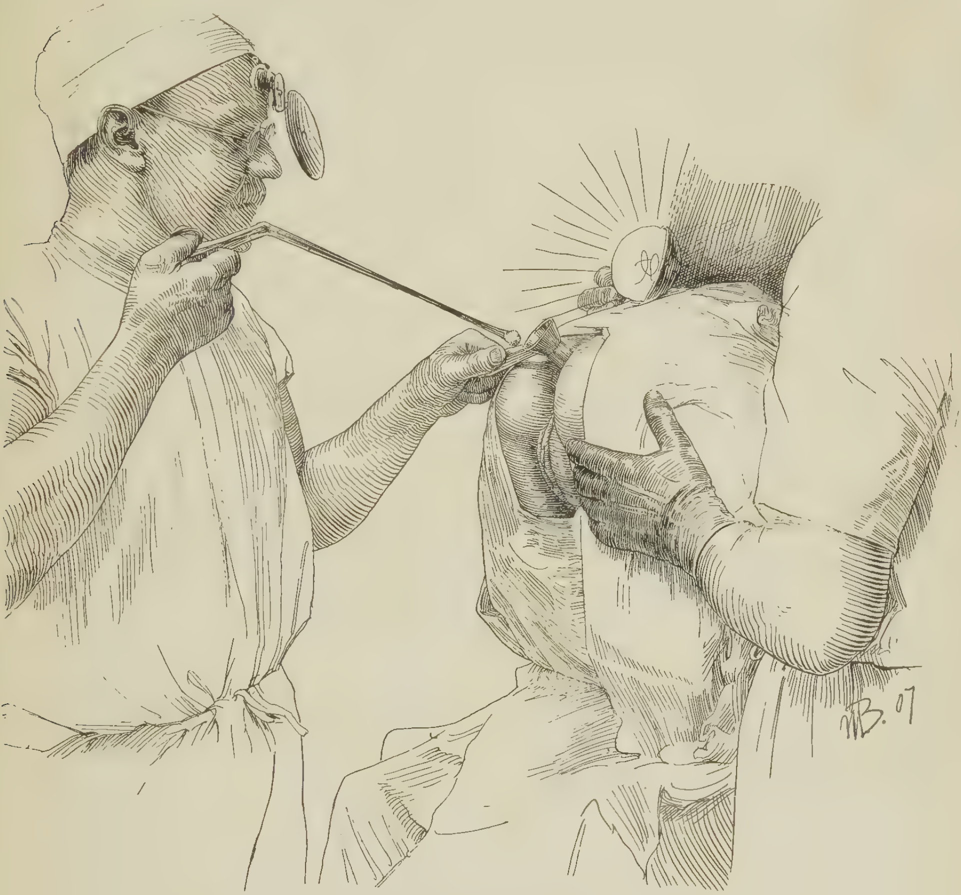

FIG. 32.—USING THE ALLIGATOR FORCEPS HOLDING PLEDGET OF COTTON TO TOUCH OR CLEANSE A PORTION OF THE UPPER BOWEL.

effecting a thorough dilatation. In some cases it is well to make light longitudinal cuts with a scalpel through the base of a fissure, so as to divide the superficial sphincter fibres.

CHAPTER II.

HYGIENE OF INFANCY AND GIRLHOOD.

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HYGIENE OF INFANCY AND CHILDHOOD.

General Considerations.—The most important factor in the development of a healthy girl baby into a healthy young woman is an intelligent mother, and no more urgent problem calls for solution to-day than that of securing adequate training for the duties of maternity. Maternal instinct and maternal love plus family traditions are not sufficient equipment for rearing a healthy family. They must be guided by maternal intelligence, while maternal intelligence, in its turn, must be aided and supplemented by a broad and enlightened public health policy. The care of the health of the growing girl begins with the education of her mother.

It is not necessary at present to multiply text books for teaching medical students and practitioners elementary facts concerning the hygiene of infancy and childhood. Medical literature is rich in material easily available for instruction. On the scientific side there is pretty general agreement as to the hygienic measures which when applied in the family and in the community will preserve and promote the health of infants and children. The medical profession has the knowledge necessary to decrease enormously the death rate of infants and children, and at the same time to increase proportionally the average of health. What it lacks is the power to apply this knowledge, because it has not control of the necessary agencies. The remedial measures in question are entirely those of preventive medicine, and they require the coöperation of educational and social forces, the formation of public opinion, legislative enactment, and administrative control.

Causes of Infant Mortality and of Ill-health among Children.—It is estimated that of all children born into the world eighty-five to ninety per cent are healthy at birth, and excluding mortality in infants resulting from immaturity, malformations, and injuries of parturition, the high death rate among infants, as well as much of the physical deterioration of the growing child, is directly traceable to external and, therefore, controllable causes. In his testimony before the English Interdepartmental Committee on Physical Deterioration, Dr. Eicholz, H. M. Inspector of Schools, says, "Other than the well-known specifically hereditary diseases which affect poor and well-to-do alike, there appears to be very little real evidence on the pre-natal side to account for the widespread physical degeneracy among the poorer population. There is accordingly every reason to anticipate rapid amelioration of physique so soon as improvement occurs in external conditions, particularly as regards food, clothing, overcrowding, cleanliness, drunkenness, and the spread of common practical knowledge of home management. In fact, all evidence points to active rapid improvement, bodily and mental, in the worst districts, as soon as they are exposed to better circumstances, even the weaker children recovering at a later age from the evil effects of infant life."

So long as a community can rest content in the belief that a large infant mortality is the natural method of ridding the race of the unfit, the doctrine of *laissez-faire* can be accepted with tolerance. If, however, it seems probable that the influence of environment must be reckoned as a greater cause of infant mortality and of physical unfitness than the influence of heredity, it may be wiser for society, as it certainly will be easier, to preserve the lives and health of the children born than to stimulate an increase in a birth rate now diminishing. As it is an open question whether the race, as a whole, suffers mental or physical deterioration from a diminished rate of production among the superior stocks, it is unquestionably a matter of public policy as well as of common humanity that conditions of living in communities should be made favorable to the preservation of the life and health of all infants and children.

Remedial Measures Demand Activities of Public Hygiene and of Personal Hygiene.—Malnutrition, due to insufficient or improper food, and infections are the greatest causes of infant mortality and of physical deterioration in the growing child. These causes have their origin in poverty, ignorance, neglect, lack of cleanliness, lack of protection from sources of infection, and lack of proper education of the child. Each one of these sources of evil has a public as well as a private aspect, and thus their removal involves activities of the State as well as of the individual. The great function of the physician in hygiene is to instruct and to guide his individual patients, and to direct and lead all those movements for social reform that aim to improve conditions of hygienic living. In modern preventive medicine the family physician assumes renewed importance and dignity.

Education of Mother Essential.—It is interesting to note in current medical literature the practical unanimity with which pediatrists are demanding that women must be educated for maternity, and this whether the pediatrist works mainly with the poor and ignorant, or with the ignorant and well-to-do. Dr. Hollopeter, in his presidential address before the annual meeting of the American Society of Pediatrists (1905), says, "A troublesome obstacle that the pediatrist encounters to-day is the general ignorance and helplessness of the young mother. . . . Instruction in the details of the baby's care, and proper guidance in the study of home modification of milk is often the main function of the medical attendant, and a maternal mind previously prepared in hygienic instruction is a great help." Of interest, too, is the insistence with which thoughtful women are demanding that the education of girls shall include some efficient training for the duties of family life. The numerous papers of Mrs. Ellen H. Richards, Mrs. Mary Hinman Abel, and others, with the discussions found in the proceedings of the Home Economic Conferences at Lake Placid, represent the trend of educated opinion and effort in this direction.

There seems to be general agreement among physicians and social reformers as to the necessity of giving all women some systematic training for home-making; there is a fair agreement as to the essentials of such training; but the methods by which all actual and potential mothers may receive instruction adapted to their particular needs have not yet been devised. In recent years courses in the household arts, cooking, sewing, etc., have been introduced into many schools in this country; school physiology, too, has been widely included in public school curricula, as a result of temperance agitation, but it cannot be said that the teaching has been adequate or effectual. The value of any such courses for young children is extremely doubtful. Experience has shown that if the teaching of these subjects is to be of real value, it must be brought very near to the period when the knowledge and skill acquired are to be practically applied by the individual in her own household.

The English Interdepartmental Commission on Physical Deterioration recommends, in addition to courses in higher schools, the establishment of continuation classes for instruction in domestic science, at which the attendance of working girls and others who have left school at an early age should be made obligatory twice a week during certain months of the year. "The course of instruction at such classes should cover every branch of domestic hygiene, including the preparation of food, the practice of household cleanliness, the tendance and feeding of young children, the proper requirements of a family as to clothing, everything in short that would equip a young girl for the duties of a housewife."

Training of the kind here suggested, given at a proper age and in an efficient way by teachers specially prepared for the work, will doubtless eventually be made part of the compulsory education of girls in our public schools. This will come when the public mind fully grasps the idea that a nation's welfare depends as much upon the physical efficiency of its citizens as upon their general intelligence.

Whatever scheme is finally adopted for the universal education of mothers, it is clear that instruction must be given to some classes of women in their own homes under medical and sanitary supervision. There is at present in this particular field of preventive medicine great opportunity for private initiative through philanthropic effort. The work of the various Instructive Visiting Nurses' Associations and similar organizations in our large cities has already demonstrated how quickly health conditions in the homes of the poor can be improved as a result of sympathetic instruction. What it is now possible to give in cities to the very poor should be available everywhere for women of the better classes. There is need for a new class of health officials—women trained especially in dietetics and the general care of children whom physicians could send to their private patients to instruct them and help them in keeping children well, as they now use trained nurses in the care of the sick.

In this connection a study of the foundation and results of Dr. Pierre-Budin's "Consultations for Nurslings" should be familiar to all physicians having the care of women and children. "Every medical man," Prof. Budin says in his lectures, "ought to regulate the feeding of all infants born under his charge. The lying-in period being accomplished, he considers his responsibilities at an end and leaves the poor woman to her own devices in rearing her child. She is expected to have an intuitive knowledge of infant feeding. She might as well be expected to conduct her own confinement. With proper direction the safety of almost every infant can be ensured, and diarrhea, marasmus, rickets, and other dietetic diseases banished from the community." Prof. Budin's "Consultations" are held for both free patients and for those who can pay. They are really classes for the instruction of pregnant women and mothers of young infants. Among other results he has been able to show that the function of lactation is not disappearing among women, but, on the contrary, the great majority of women, by proper food and hygienic care during pregnancy, are able subsequently to nurse their children. It can easily be imagined that a rapid hygienic transformation, public and private, could be made in any given locality if every physician who delivered a woman should be held responsible for the infant's life and health during its early years. Practitioners themselves would quickly acquire a better knowledge of dietetics and the relation of food to health and growth. They would promptly devise some method of effectively educating mothers and nurses to whom the care of young children is directly committed.

When medical inspection of public school children becomes an accepted policy for all public schools of all grades, it will be easy to foresee the possibility of an extension of the system to include an inspection of children before the school-going age. Mrs. Parsons in "The Family" already suggests, in addition to the training of girls of all economic classes in the care of young children, a system of State supervision of the home education of actual and potential public school children, by an extension of the functions of the medical inspectors of schools and school nurses. The school nurse who follows school children to their homes has already demonstrated that improved hygienic conditions for the younger children may be expected when mothers are given sanitary instruction in their homes.

Public Hygiene.—Ability to obtain food, and "intelligent mothering" are primary essentials in maintaining the life and preserving the health of infants and children, but they are not sufficient. Only by the aid of the community or of the State can the home secure a pure and sufficient water supply; efficient removal of sewage and garbage; pure and clean food, including pure clean milk, and clean air; proper housing conditions; and protection from infectious diseases.

The last fifteen years have witnessed a great awakening in our country to the dependence of the individual health upon public sanitary measures. Object lessons there are in plenty demonstrating the ability of preventive medicine to diminish mortality and morbidity, if trained health officials are vested with necessary power. It is only necessary to mention Havana and Panama. In New York City, infant mortality has been decreased fifty per cent in twelve years by an improvement in public hygienic conditions.

Water Supply and Disposal of Sewage.—Education regarding the relation of the public health to a pure water supply and efficient disposal of sewage has gradually secured for urban communities in this country satisfactory efforts towards proper conditions, but much remains to be done before this can be said of small communities. The demonstration of the relation of flies and other insects to infectious diseases gives increased importance to the necessity for proper disposal of human excreta. Better protection of water supply or efficient purification, with sanitary disposal of sewage, are reforms widely needed in suburban places.

Clean Air.—The pollution of the air with smoke and dust, and the methods of street cleaning, or the lack of it, have a very direct effect upon the health of children. The dangers from dust are greater for them than for the adult, both because they have less power of resistance to many infectious diseases, and because their habits of play and their low stature bring the entrance to the respiratory apparatus nearer the floor and the street.

Public Control of Milk Supply.—Efforts to secure pure and clean milk have not kept pace with medical knowledge of its relation to the health of infants and children. In the last few years, mainly through the efforts of the medical profession, it has become possible for the well-to-do in most large cities of the United States to obtain pure, clean milk, usually an impossibility in country districts. Philanthropy has made this possible, also, for the poor of many cities, who can now obtain at a nominal price, at various distributing stations, clean fresh milk or sterilized milk for children. The results in New York from the stations established by Mr. Nathan Strauss are well known. It is difficult to understand the conditions of milk production that are still tolerated in rich farming communities, in towns, and in villages, since experience has taught how quickly a good quality of milk can be secured by intelligent effort.

In every locality where physicians have combined to secure a clean pure milk they have succeeded promptly. Rochester, New York, furnishes an example of what may be accomplished by a capable health official, and the results obtained by the various milk commissions organized in recent years show how promptly practical results follow the concerted action of physicians. The Milk Commission organized by the Philadelphia Pediatric Society and that by the New York County Medical Society are notable examples. Statistical information is already forthcoming showing an astonishing decrease in the mortality of infants directly traceable to an improvement in the milk supply.

What has been accomplished in larger and smaller cities of the country in the production of certified milk by milk commissions ought to be matters of common knowledge to physicians and stimulate them to similar activities. The first Walker-Gordon milk was supplied from an ordinary farm, with ordinary cows, by the work of one farmer's family. Some encouraging results in Elmira, N. Y., have recently been reported, which afford a good illustration of what may be done in smaller places. A woman was found with some general knowledge of the benefit of clean milk, who was willing to take up the work. She built a new barn, and had her herd tested for tuberculosis. A standard of 10,000 bacterial count was established and the other usual conditions imposed. The milk was cooled, bottled within a few minutes after it was drawn and then put into a crate, the top of which was filled with crushed ice. The night and morning milk was delivered to the consumer not more than ten hours from the time the oldest of it was drawn the night before. This was accomplished simply by using the means at hand, and what has been done in Elmira could be done in a score of other cities of the same size. Continued public agitation, aided by the work of the agricultural experiment stations, should make the work of milk production a trained industry under constant public supervision.

Improvement of Housing Conditions.—The movement for improved housing conditions of the poor in cities is of great hygienic significance. Overcrowding, with its attendant evils of bad air, uncleanliness, lack of sunlight, and bad sanitation is, after improper and insufficient food, the greatest cause of death and sickness among children. There is at hand, easy of access, an ample bibliography demonstrating the wretched conditions existing in many of our cities. Booth in his "Life and Labor in London" says, "Crowding is the main cause of drink and vice." As "drink and vice" are the greatest causes of hereditary degenerations, overcrowding, both by its direct and indirect influence upon the health of children, must be reckoned as a principal source of physical deterioration among them. Figure 33 shows a room in which ten persons lived, ate, drank, and slept, and which was the only place in which one of them, a boy of five or six, could recover from a broken leg. As a result of the activity of social workers and philanthropists it has been demonstrated: (1) That improvement in health promptly follows better housing conditions, and (2) that model tenements are a paying investment. A great sanitary reform, therefore, need not be impeded by economic reasons. Stringent tenement house laws with rigid enforcement must be considered a vital hygienic necessity for the health of a large number of children.

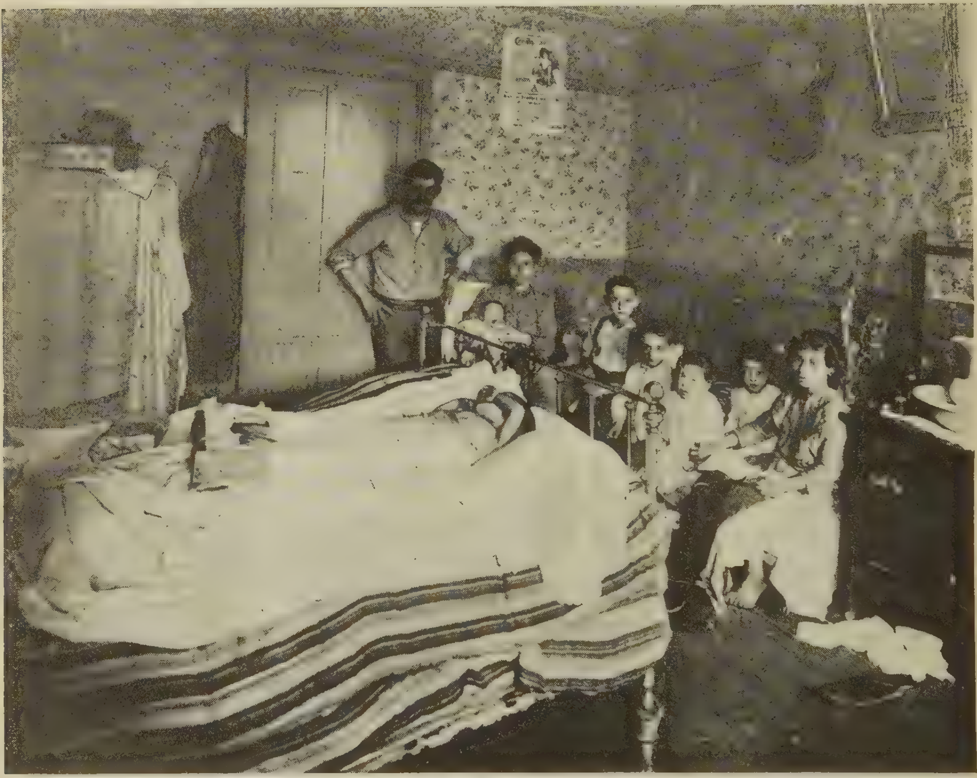

FIG. 33.—THE HOME OF A FAMILY OF TEN PERSONS IN BALTIMORE.
(Taken by Mr. Scott of Hughes & Co., Photographers, Baltimore.)

A study of the housing conditions in Baltimore, made by Miss Janet Kemp under the direction of the Association for the Improvement of the Condition of the Poor and the Charity Organization Society, furnishes a recent contribution to this subject (1907). This admirable study illustrates well the necessity for watchfulness of conditions even in a city where no tenements are supposed to exist, and shows how rapidly the growth of tenements may proceed within the four walls of dwellings intended for single families. With our present hygienic knowledge, the sanitary conditions under which the poor live in overcrowded houses and tenements should not be tolerated in decent communities (see Fig. 34). The hygienic results in tenement house reform aimed at by such movements as this appeal to the most selfish interests, as well as to the most altruistic. The children of Dives in his palace are menaced by the conditions surrounding Lazarus in the slums. Twenty-two families living in forty-four rooms facing each other across a small court with no other outlook,

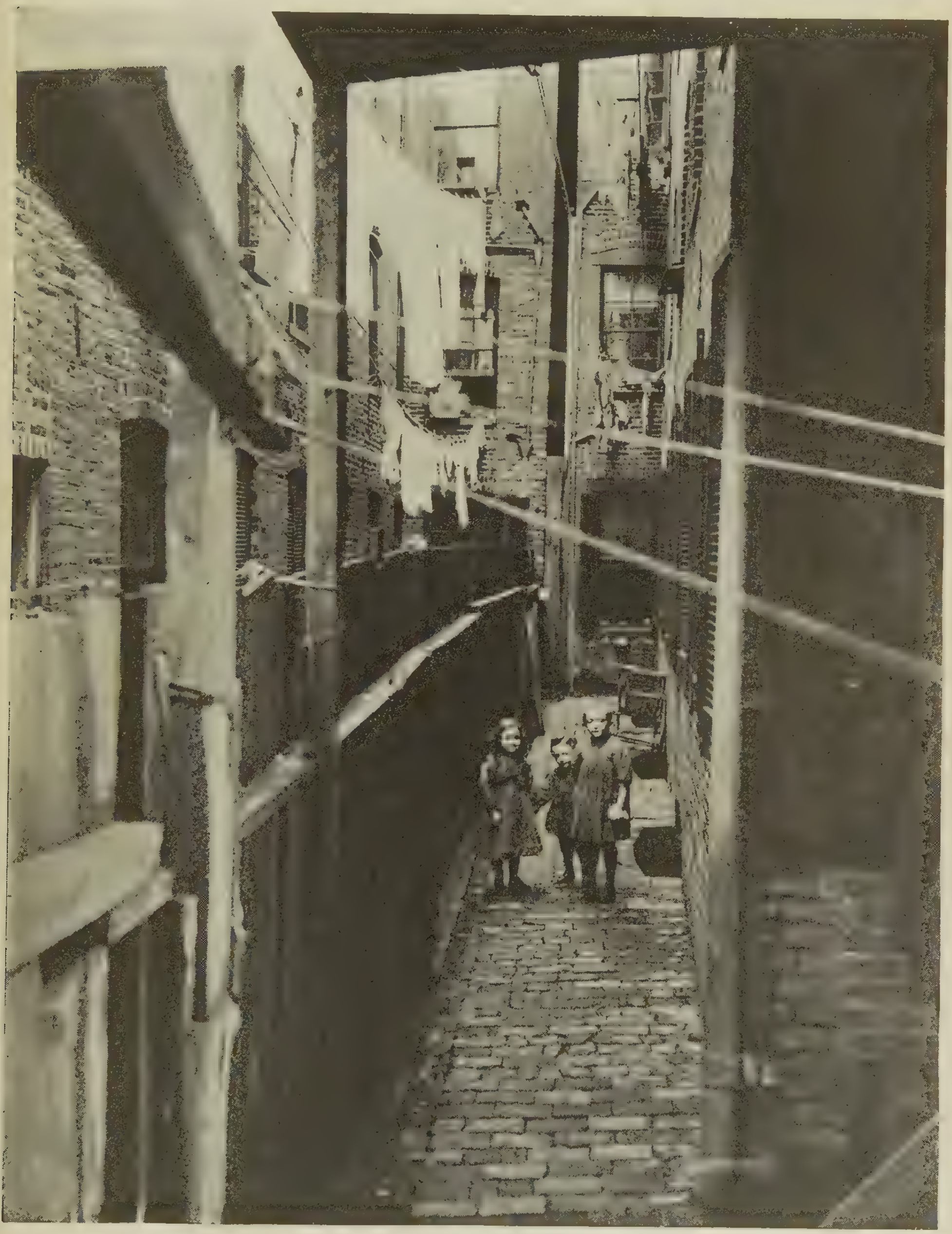

FIG. 34.—A COURT IN A CROWDED CITY DISTRICT. (From "Housing Conditions in Baltimore.")

sharing among them two privies with three compartments, and one hydrant, the court owned privately and, therefore, independent of the Street Cleaning Department, in a city with no contagious disease hospital, present a difficult problem to preventive medicine (see Fig. 35).

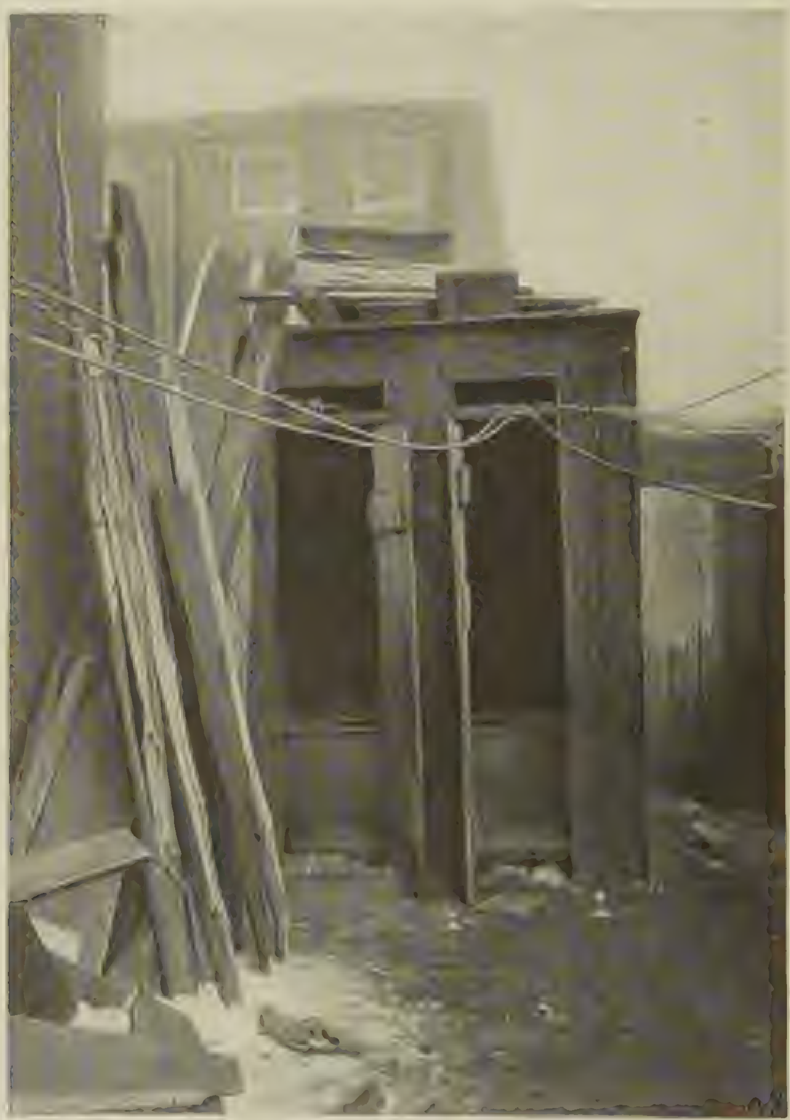

Fig. 35.—Toilet Accommodations for Twenty-two Families. (From "Housing Conditions in Baltimore.")

An interesting question might be raised here as to the effect on the health of the growing child of life in the apartment houses for the well-to-do, which have multiplied with such rapidity in recent years in all large centres of population.

Public Parks, Public Playgrounds, Public Baths.—The extension of city park systems, especially the establishment of small parks, the use of school yards and city lots for public playgrounds, out-door gymnasiums and swimming pools are all powerful influences in promoting the health of the growing girl. Towns as well as cities have much to gain by encouraging out-door life among children.

Especial emphasis must be placed on the necessity of making adequate provisions for girls in all arrangements for sports and games in the open air which are under public control. Out-door swimming baths and gymnasiums for boys should be duplicated for girls, or reserved for them at specified times (see Fig. 36). Traditions as to what is proper for girls are difficult to overcome, but mothers must learn to keep their little daughters in the open air as much as possible, and to encourage those plays and sports which take them out of doors. The public playgrounds where girls may spend hours in the open air under watchful control are a great educational force in both the physical and moral development of the child. They should not be for the poor only, but also for those who can afford to pay for the care given. They ought to be in all towns and villages, where it should be possible at all seasons

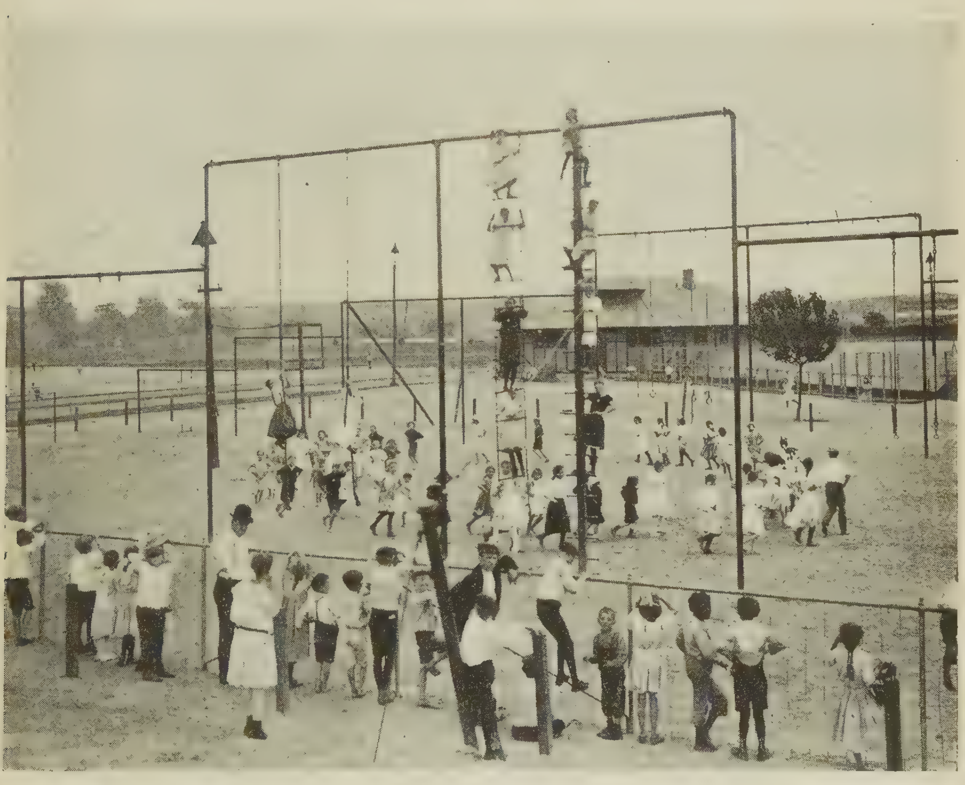

Fig. 36.—Open Air Gymnasium, Girls' Day. Patterson Park, Baltimore.

of the year for young children to play in the open air under proper guidance. It would be difficult to estimate the beneficial effect of such out-door life under efficient direction upon the health of girls.

Public aids to personal cleanliness by the establishment of public baths and laundries in congested districts of large cities are legitimate charges upon the public purse. They are material aids to encouraging cleanliness of children among those classes who need it most.

Protection against Infectious Diseases.—Infectious diseases with their sequelæ are, after malnutrition, the greatest source of illness, acute and chronic, among children, while the chronic ill health of adults is often traceable to imperfect recovery from some of the ordinary infectious diseases of childhood. The prevention of infectious disease is, therefore, of the greatest importance to the good health of the growing girl. Moreover, there is every reason to believe that not a few of the gynecological affections from which so many women suffer have their starting point in the infectious diseases most common in childhood (see Chap. X).

The knowledge now in possession of scientific medicine as to the etiology and prophylaxis of many infectious diseases is ample to enormously diminish their incidence in child life and their effects upon the health of the adult. It is well known to physicians that the prevention of infectious diseases among children involves: (1) Knowledge of the exciting cause, or of some effective method of preventive inoculation; (2) power to control those external conditions by which specific infective agents are multiplied and propagated; (3) power to control those external and internal factors by which resistance to infection is increased. They know, too, that the ability of the individual physician in private practice to limit the spread of infectious diseases is confined: (1) To preventive inoculations; (2) to trying to secure isolation; (3) to instructing parents in matters of personal and public hygiene; (4) to calling to his assistance such administrative control as is operative in his particular community for the enforcement of public health measures for the common good. Sanitary reforms of public health administration are as necessary for the physician in his practice as for the general public.

Among the measures which may be expected to materially diminish infectious diseases in the future are: (1) Multiplication of laboratories for research into causes of infectious diseases and the measures for their prevention; (2) thorough reorganization of public health departments with a great extension of their powers; (3) employment of such health officers only as have had special training for their work or have shown a special fitness for it; (4) medical inspection of all school children; (5) establishment of health laboratories, at such convenient centres in small communities that all physicians may have the skilled assistance in bacteriological and clinical diagnosis which the best municipal laboratories now give to city physicians; (6) establishment of isolation hospitals for infectious diseases, or isolation wards in all hospitals receiving state aid; (7) the practice of better personal hygiene.

The adoption of effective measures of public hygiene can be secured only by a vigorous campaign of education in the principles and practice of preventive medicine. The thinking public must be convinced that health is secured best by preventing disease, not by curing it. That it is easier to obtain from the public means to cure than to prevent is illustrated by what has been accomplished in the campaign against tuberculosis. State aid for incipient curable cases is accepted generally as good public policy, while the necessity of provision for the isolation of advanced cases, which are the greatest menace to public health, especially to that of children, has received as yet little public recognition.

Summary.—Ill health among children is largely the result of post-natal influences. To maintain their life and promote their health requires sufficient and proper food, fresh air, cleanliness, sleep, rest, exercise, the formation of hygienic habits by education, and protection from the harmful influences of environment. Physicians are informed or should be informed about these matters, but their knowledge is of little value unless they can secure its practical and intelligent application in the household through mothers and caretakers; and in public through public opinion, legislative enactment, and administrative control. The duty of the profession, so far as hygiene is concerned, is to inaugurate some systematic plan for instruction of mothers of all classes on subjects of personal hygiene; and of the general public in matters of public hygiene.

HYGIENE OF THE SCHOOL GIRL.

School-going Age.—Most girls spend a part of the period from six or eight to seventeen or eighteen at school. Many States determine this fact by the enactment of compulsory education laws. In every intelligent community the schools are tacitly considered to offer the best means for the development of the mind of the child; they should aid and supplement the home in the development of the body. No fixed rule can be given as to the age at which the small girl should be placed in school; the decision in each case must be based upon a comparative study of both the home and the school and the physical and mental status of the individual child. For the weak and anemic girl with poor physical inheritance and with home possibilities of good nourishment and out-door life—six to eight years is too early; the same girl from a dirty insanitary home is certainly better off in school.

At whatever age the girl enters school, her education has already been begun and carried far at home; habits have been formed, principles instilled, and tendencies developed and trained. The best school available for the continuation of this education should be chosen, co-educational or otherwise. In early school life at least, sex difference should not be emphasized in the selection of the school nor in courses of training. There is no essential difference in the physical needs of growing children. All animal necessities are the same, the same food is eaten, cell processes are similar, the same exercises are enjoyed. Boys and girls like equally well to ride, to swim, to climb trees, to play basket-ball. Exercises for children should not be restricted, or adapted, or classified on a sex basis as boyish and girlish. Playfair says, "Up to the time of puberty there is comparatively little difference between the sexes in health, in disease, or in any other condition. Conventionally, they are separated and different modes of education and training will soon make such difference as there is more marked, but boys and girls play together, work together, and are generally on a footing of perfect equality, there being little essential which distinguishes one sex from the other." As education progresses the boy is trained to courage, endurance, and manliness, is taught to protect the weak, to be depended upon, to provide for himself and others, and, in short, is educated with the idea that he is to be the head of a family, to bear civic responsibility, to assist in guiding national affairs, to be economically independent. The girl is trained to directly opposite notions; she is expected to be helpless and dependent, and this undoubtedly is a distinct hygienic disadvantage.

In recent years there has been a recoil from older ideas and the trained intelligence of educated women has been successfully applied to many of the problems of the child's education. As the education of mothers progresses and becomes more specific, still better results in the education of girls will be attained. No degree of native intelligence, no advantage of modern educational method is too great for the woman who is to be a mother, no knowledge, but may be put to use in the care of a home or training of a child. There is no possibility of over development of the powers of either father or mother when we consider that, biologically speaking, the production and education of children is the greatest human achievement.

It is the duty of parents to bear children with good physical and mental capacities and to train their natural endowments to their most perfect development. Each successive generation should be superior to the preceding by at least some small increment of physical strength and mental or moral vigor. Oppenheim says, "The spirit of the hour calls for a strenuous effort, a desire to improve upon the past, a noble dissatisfaction that can be quieted only by an active exhibition of individual endeavor." The nearest duty to the individual is but the greater duty to the race, and a parent's apparently egoistic effort for the welfare of his own offspring is, in a larger sense, a contribution to race development.

Hygienic Habits of the School Girl.—A girl at the school age is the product of her home environment and brings to the new conditions of her life a physical preparation which is the direct result of her inheritance and home care. Her general condition and power of resistance should be at the maximum. She should have certain fixed hygienic habits. Her food, her clothing, her hours of rest and of sleep should be regulated by the solicitous care of intelligent parents. The breakfast, the bath, the care of the nails and teeth, attention to the evacuation of the bowels should be matters of daily routine. These early lessons in physical education are an important part of the parents' responsibility to the child.

A surprising number of school children habitually eat no breakfast. Inability to take breakfast is always sufficient reason for keeping a child from school. Two reasons for this are obvious: the work of the morning will make far greater demand upon the child's vitality, if energy furnished by breakfast is lacking; and, in the interest of the school, the fact should be determined whether the child is suffering the initial symptoms of contagious disease, in which case she should not be permitted to mingle with other children.

A daily bath may be considered a hygienic necessity. It is a matter of common observation that mothers who are careful to bathe a baby daily throughout infancy consider a weekly bath adequate for the same child as it grows older. This is true, not in the homes of the poor alone, but often in those where complete bathing facilities exist and the physical work of keeping clean is reduced to a minimum. Under the conditions existing at present in many homes the schools must furnish instruction in personal hygiene, and it would be an advantage if they were equipped with shower baths in order to carry out such teaching practically. In some continental cities the shower bath is part of the daily school routine. Teachers should encourage children from homes lacking bathing facilities to make use of the public baths in those cities where such systems exist. The child should have learned, too, that clean clothing is as necessary to personal cleanliness as a clean skin and that the underclothing should be frequently changed. Many children from the better classes are not carefully trained in this particular.

The care of the teeth in young children is of great importance. Too much stress can hardly be laid upon the necessity of early training in habits of mouth cleanliness, not only because of the importance of preserving the teeth, but also because of the relation of the bacterial flora of the mouth to many infectious processes.

The habit of daily evacuation of the bowels is largely a matter of early training. No more important habit can be cultivated in infancy and childhood. Most cases of persistent constipation in adult life are attributable to a failure to establish this early habit, to dietetic errors, or to neglect of a tendency towards constipation (see Chap. VIII). Haste and disorder in the early morning hours are very unfavorable to the establishment of regular habits of going to stool. The hour of rising should be regulated to allow time sufficient for the bath, the toilet, the breakfast, and the evacuation of the bowels. Breakfast should be ready promptly at the hour; many cases of ill health in growing children can be traced to a habit of going to school without breakfast, or of swallowing their food hastily without mastication, or to a failure to observe the regular time of going to stool.

The Dress of Young Girls.—The method of dressing little girls according to present standards is almost ideal. Simplicity of style, lack of constriction and pressure, lightness combined with warmth, support by shoulders and thorax, materials well chosen, and shoes of good shape combine to make the well dressed young girl a strong contrast to her older sisters.

Physical Condition of the School Girl.—It is very desirable that the physical condition of every girl about to enter school be determined by medical examination. Unless a child is in good physical condition, she may not only be unable to profit by the advantages offered, but even be harmed by attendance at school. It is futile to attempt to educate children who are not in physical or mental condition to be educated; moreover, the school-going age is the most favorable period for attention to many defects or tendencies which have been overlooked during infancy and early childhood. Corrective and preventive work may be carried far during these plastic years, and much may be accomplished toward right development which, later in life, would be found to be impossible. It is equally important that the child entering school should not be a source of danger to other children, as she will be if she is suffering from any form of communicable disease.

Unless both the physical and mental status of each child is intelligently determined, she cannot be properly classified. Underfed children, those who have errors of vision, adenoids, or scoliosis are frequently considered to be mentally retarded, whereas experience has shown that many such cases may be returned to the normal classes, if their physical condition receives the necessary attention. Of a large number of Boston school children classed as truant or backward ninety-five per cent were found to be physically defective. Under the conditions of the present day a system of medical inspection of schools furnishes the most efficient method for obtaining the facts which will enable any community to render the schools the best means for the development of the child and for its preparation to receive the greatest benefit from education. It is astonishing that the public has been so slow to recognize the value of what seems such a self evident proposition. Many European countries have had a system of partial inspection for some years. Japan introduced medical inspection in 1893 and in 1906 had eight thousand four hundred and twenty-four inspectors, while the whole United States had but six hundred. Although medical inspection in the United States has been slow of adoption and is limited in application, New York has the most comprehensive and highly developed system of medical inspection of schools in the world. It was established in 1896, one hundred and fifty inspectors were appointed, and during the first year six thousand eight hundred and twenty-nine pupils were excluded on account of various diseases. In 1902 six oculists were added to the staff. Subsequently a corps of trained nurses made the work more effective by securing immediate attention to minor ailments and to skin and parasitic troubles. A short statement of results during the year between March 27, 1905, and March 31, 1906, is instructive.

Number of Examinations made, 79,065.

Poor nutrition	4,537
Enlarged ant. cervical glands	22,493
Enlarged post. cervical glands	4,989
Chorea	1,184
Cardiac disease	1,332
Pulmonary disease	885
Skin disease	1,574
Deformity of spine	674
Deformity of chest	500
Deformity of extremities	663
Defective vision	24,534
Defective hearing	1,633
Defective nasal breathing	8,974
Defective teeth	29,386
Defective palate	936
Hypertrophied tonsils	13,411
Post-nasal growths	7,375
Defective mentality	1,477
Number where treatment was necessary	50,913

That sixty-three per cent of all children who enter the schools of New York need medical treatment is a tremendous indictment against the efficiency of the home, and demonstrates also the inability of the medical profession to prevent disease when its relation to the family is entirely dependent upon the volition of parents. There are no available published statistics for comparison from private schools which draw their pupils exclusively from the well-to-do classes, but even here, wherever careful medical examinations and re-examinations have been made, a surprisingly large percentage of girls have been found suffering from remediable physical defects, the most common of which are poor nutrition, defects in vision, defective hearing, enlarged tonsils and post-nasal growths, and chronic skin affections. To these various causes of ill health a careful analysis may trace most of the disturbances of function of the reproductive organs in girls and young women which do not result from congenital malformations, the effects of trauma, or infections. The educational processes of the schools are not entirely blameless, but they are not responsible for the large percentage of acquired ill health in women so often charged against them.

Faulty nutrition is the source of more ill health among school girls than all other causes combined. Measurements of large numbers of school children have shown clearly the direct relation existing between nutrition and growth. Chlorosis, many skin troubles, low power of resistance to some acute and chronic infections, slow recovery after acute infectious diseases, and a low average of general health are all directly traceable to malnutrition. A relatively small number of underfed children reach a reasonable proficiency in their school work. Good nutrition, therefore, is essential to good education. This question of nutrition is one for the family, but its recognized importance has found expression in some localities in Continental Europe in the provision of breakfasts and luncheons for the poor, with the result of astonishing betterment in both physical and mental condition of the children. But evidences of malnutrition are common, also, among girls of the better classes, who often fail to eat enough plain, nourishing food, or suffer from loss of appetite consequent upon an indulgence in unsuitable food at the family table, or upon sweets obtained between meals from candy and cake shops and soda-water fountains in the vicinity of school houses. A warm, nourishing, midday luncheon is essential for a girl's good health. School sessions must be arranged with this in view, and where the distance makes it impossible for the girl to go home to obtain it, the school should see that suitable provision is made in or near the school building. In this latter case the food furnished should be supervised by the school principal, and an effort be made, at least, to guide the choice of the individual girl as to the kind and quantity of food eaten. Thomas Madden Moore says: "If the State, for reasons of public policy, determines that all children shall be compulsorily educated from their earliest years, it should certainly afford the means by which this may be least injuriously and most effectively carried out, by providing sufficient food as well as education for every pauper child compelled to attend school."

Condition of Eyes of School Girls.—The result of the examination of the eyes of school children in those schools where medical inspection has been introduced are sufficiently significant to warrant the statement that no child should be permitted to enter school without having had the eyes examined by an ophthalmologist. The ophthalmic inspectors of New York City found thirty-three and one-third per cent of children in the schools with defects of vision of sufficient importance to interfere with the proper pursuit of their studies. The effect of eye-strain on the general health of the child, the possibility of some interdependence between eye-strain and certain disorders of menstruation, insomnia, and nervousness, the presence of eye-strain as a causative factor in the production of scoliosis are all subjects which are being earnestly discussed, and the conclusions of those who can speak with authority show that no defects of vision can be regarded as trivial. Many parents are extremely averse to sending their children, especially girls, to an ophthalmologist, permitting the child to suffer the consequences of a physical defect with no more reasonable excuse than the dislike of the esthetic effects of glasses. Attention to the eyes of children on entering school would protect them against the increasing percentage of defects of vision in the higher schools. Dr. Kerr, from his observations in London, found that ninety-five per cent of children between six and six and one-half years of age have normal visual acuity. A steady increase in myopia is noted in the ascending grades. Dr. Hermann Cohn, after testing ten thousand pupils, found twenty-two per cent with myopia in the youngest classes and fifty-eight per cent in the higher. School construction and school appliances should recognize the needs of the eyesight of the school child in the lighting and color of rooms, size, form and type of books. work from black-boards, school seating, methods of teaching writing, substitution of paper for slates. Kindergartens require too much close work from children.

Condition of Ears, Nose, and Throat.—Many girls in both public and private schools are found to have defective hearing in one or both ears. Since ninety per cent of such cases are probably curable, if discovered early and properly treated, it becomes a matter of great importance that the cases which have escaped detection until the school-going age should receive suitable care before a condition of permanent deafness is established. Many cases of defective physical development and impaired health are directly due to the limitation of breathing capacity resulting from hypertrophied tonsils and post-nasal growths. Inasmuch as the tonsils and the peri-tonsillar mucous membrane of the pharynx are often the portals of infection for acute rheumatism, endocarditis, and otitis media with mastoiditis, abnormal conditions of the tonsils and naso-pharynx, both acute and chronic, must receive careful and prompt attention. Acute tonsillitis in children can never be looked upon as an unimportant disease, and following such attacks children should be kept from school until their health is fully restored. Kisch holds that there is some interdependence, either nervous or circulatory, between hypertrophy of the tonsils and disorders of menstruation, and cites instances of retardation of the appearance of menstruation and lack of development at puberty which were quickly corrected after the removal of hypertrophied tonsils. This observation receives some confirmation in the fact that a large proportion of the cases of either slight or severe dysmenorrhea among one hundred school girls between the ages of thirteen and eighteen, under careful medical supervision, had enlarged tonsils, or had had them removed. The rapid development, both mental and physical, frequently observed in the individual girl after surgical attention to these conditions is most striking. No less marked is the improvement after operation in minor conditions, as the adenoid expression, mouth breathing, defective nasal development, and the hoarse or nasal voice frequently accompanying enlarged faucial and pharyngeal tonsils. Without doubt future investigation will show causative relations between adenoids and serious diseases not at present referred to them, but we have even now sufficient knowledge to insist that the development of the growing girl shall not be threatened by the lack of their removal.

The importance of determining the exact physical status of each girl upon entering school has been emphasized. It is equally essential that the results of such examination be followed by skilled attention to the defects discovered. It is of small avail to the welfare of the individual girl that the fact has been revealed that the eyes are myopic, that scoliosis is present, or that adenoids obstruct the nasal passages, if means are not taken to remove such handicaps. Unfortunately, parents, and even family physicians, frequently oppose any active measures for removing such defects, as in a case of advanced scoliosis, recognized by the school physician in its incipiency, which failed to have any effective treatment because of the attitude of the family physician.

School Buildings and Appliances and the Health of the School Girl.—If the girl presents herself at the school clean and well, she should find the environment of the school favorable to the preservation of her health and furnishing protection against infectious diseases. It may be truthfully said that most American schools do not, at present, afford such environment. Ideal conditions can be secured only by efficient sanitary oversight of school construction, school furnishings, and school administration. When one considers that the schools are often centres of infections, possibly the most common source for young people, it is evident that all communities should establish medical inspection and sanitary supervision as a measure of public hygiene. Indeed it is questionable whether compulsory school attendance is warrantable without the protection afforded by such compulsory supervision. School architecture has made great strides in recent years, and many modern school buildings in both city and country districts are admirably adapted to their purpose; but even in these, the hygienic demands of the school have not always received the attention demanded by their importance, while many old school buildings are entirely unsuitable for use, on account of their location, construction, lack of suitable heating and ventilation, and of proper lighting. In all school buildings, even the best, school management is responsible for important hygienic necessities that often receive scant attention; over-crowding and improper seating are common, out-houses and toilet rooms are insufficient, unsuitable, or uncared for; methods of school cleaning are inefficient and even dangerous; drinking cups are used in common; school books, pencils, and other appliances used in common are not cleaned nor disinfected; children habitually dirty are not separated from the clean, nor is there provision anywhere for school baths. A more widespread knowledge of existing conditions in schools, as well as a better general knowledge of sanitation, will be necessary before better sanitary conditions will be common in all schools.

The number of cases of communicable parasitic and skin diseases discovered among school children by medical examiners suggests the desirability of separating the habitually dirty children from the clean. The services of the school nurse in following up cases of this nature have been productive of very marked improvement in the condition of personal cleanliness of individual children. Health talks to mothers under the joint supervision of educational and health authorities would be far-reaching in hygienic results.

The dangers of dust as a carrier of disease germs make a reform in methods of cleaning school-rooms necessary. Janitors and care-takers must be supervised and trained in the best methods of moist cleaning and dusting.

Boston is said recently to have spent one thousand dollars in one year for feather-dusters!

Out-houses and toilet-rooms must receive more enlightened attention. Dirty, unsanitary, and unsuitable closets are common, and usually there is no supervision except that given by the care-taker. The conditions of these closets is in many ways a menace to health as well as to morals. Moreover many cases of constipation in adult life may be traced back to school conditions where the closets provided were so disgusting as to inhibit in a sensitive child the desire to go to stool, or to evacuate the bladder.

All teachers of the young should be instructed in the elements of personal and of school hygiene. Their intelligent initiative and coöperation is necessary in all measures for rendering school attendance a healthful experience. The teacher's ideas of ventilation, for instance, are what eventually determine the condition of the air of the school-room; her example in matters of personal cleanliness, neatness, and clothing may influence markedly the habits of the girls under her care. No system of medical supervision can be adequate or effective without the cordial coöperation of teachers who have an intelligent knowledge of the objects to be gained.

Physical Training and Medical Gymnastics.—Carefully supervised physical training is one of the most important and rational factors in the life of the school girl. J. Madison Taylor says: "Children cannot be expected to grow up properly unless directed." This fact is easily demonstrated by a comparative study of girls who have had every favorable opportunity for spontaneous growth and those who have had the advantages of systematic training in a modern gymnasium. Indeed the physical differences between girls of sixteen or seventeen who have had well-directed gymnasium work and those who have not had it are so marked that an experienced examiner has little difficulty in separating the one class from the other by simple inspection. No one with medical training who has had the opportunity of examining large numbers of healthy girls in preparatory schools and observing the effects of good gymnasium work upon them, can fail to become an enthusiastic advocate of systematic educational gymnastics as a necessary part of a girl's education.

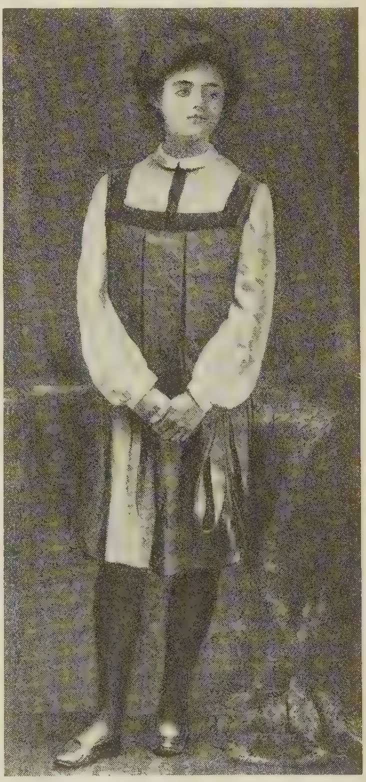

Fig. 37.—Model Gymnasium Suit, used in Madame Osterberg's Physical Training College, England.

Various systems of gymnastic training are used in this country and each system has certain advantages, but whatever the system, the work, to be useful, must be regular, systematic, and adapted to the needs of the average healthy girl. It should be given by a special teacher trained for the work, should require a special dress for the girls (see Fig. 37), and should have a room built and equipped for the purpose. It needs always careful and continued medical supervision. It must seek to gain two results: (1) The general systemic effects of exercise, such as improvement in respiration, circulation, digestion, etc., including the acquisition of increased nervous control over bodily movements; (2) the correction of physical defects, such as faults of posture, carriage, etc., which are not the result of pathological changes in tissues, but are largely due to the environment of school life.

All the systemic effects of exercise gained in the gymnasium could doubtless be obtained from out-door athletics with the additional advantages of the open air, were it possible to make girls take this in definite amounts systematically and regularly under guidance, but this is not possible. The corrective work distinguishes the results gained in the gymnasium. The necessity for such work is shown by the fact that eighty per cent of girls who enter college without previous good gymnasium training show defects of posture and carriage which are almost entirely lacking in those who have had systematic gymnastic work. In this connection reference should be made to the subject of proper school seating, as this is one important factor in causing defects that need remedy. Although the principles of correct school seating are very simple, few schools have proper seats and desks. Many are non-adjustable, and many of the so-called adjustable seats and desks cannot be properly fitted to the individual pupil. The rules to be followed are: (1) The height of the seat should equal the distance from the floor to the under part of the knee; (2) the height of the desk should equal the distance

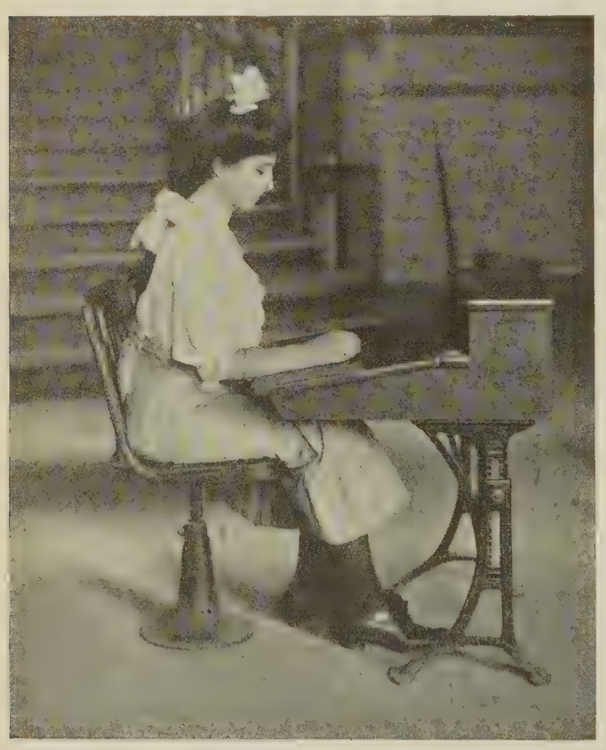

FIG. 38.—ADJUSTABLE DESK WITH NARROW BOX; BOTH SEAT AND DESK ARE ADJUSTED TO THE PUPIL WHEN SEATED.

from floor to elbow plus three-quarters of an inch; (3) there should be a minus distance of at least half an inch between front edges of desk and seat; (4) the box of the desk should be sufficiently narrow at its front edge to permit above adjustment without pressure upon knees. Measurements should be taken and the desk and seat of each girl properly adjusted at the beginning of each school year. The growth of the girl should be watched during the year and readjustment made whenever necessary. The accompanying illustrations show an ideal adjustable desk (Fig. 38) properly fitted, also a so-called adjustable desk incapable of adjustment on account of the depth of the box at the front edge (Fig. 39).

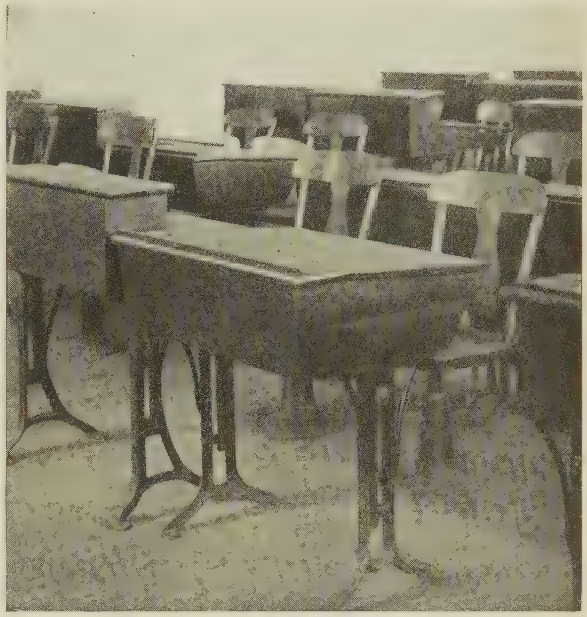

Fig. 39.—Desk with Irons Similar to that Shown in Fig. 38. This is sold as an adjustable desk, but the box is six inches in width at the front and cannot be adjusted to the majority of pupils without pressure upon the knees.

In every scheme of physical training out-door athletics should supplement the work in the gymnasium. The habit of out-door exercise should be established in the early years of life and the growing girl taught to regard it as one of the essentials of healthful living.

Several hours each day should be spent in the open air by every girl attending school. It would be well if the school could make compulsory a definite amount of out-door exercise under guidance. Nearly all the sports and games boys are taught in the open air can be used equally well for girls, when guarded by medical inspection. Playfair says: " One chief reason for the more frequent break-down of girls than boys at school is probably that the male's work is safeguarded by an amount of physical exertion in the way of sports which tends to keep him in health, and that this is usually compulsory in boys' schools, and optional in girls'." School grounds should be ample. Athletic fields for girls are as necessary as for boys. Playgrounds in parks should be set aside for girls. They should receive instruction in swimming. School swimming pools and public swimming baths (see Fig. 40) afford facilities for such instruction, which are easily popularized. The habit of taking exercise in the open air, firmly fixed on the girl, makes it a necessity for her when her formal education is completed, and this is of inestimable value in maintaining and promoting her health in after life.

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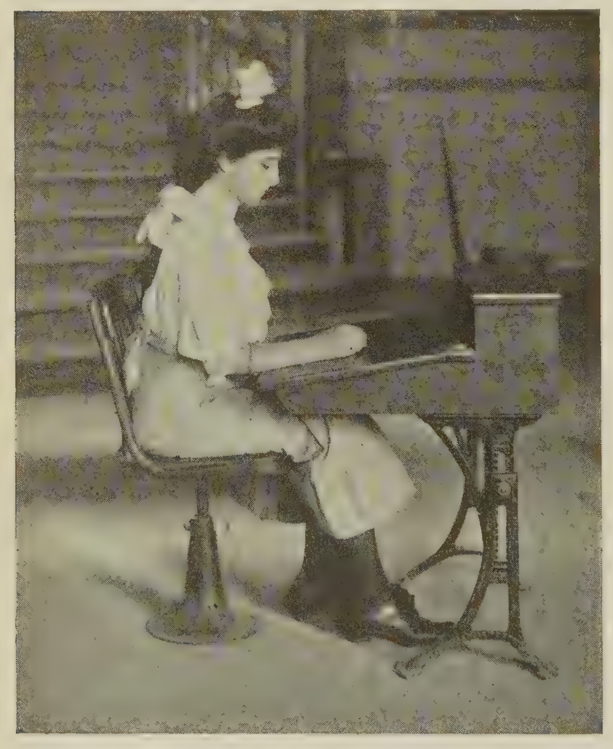

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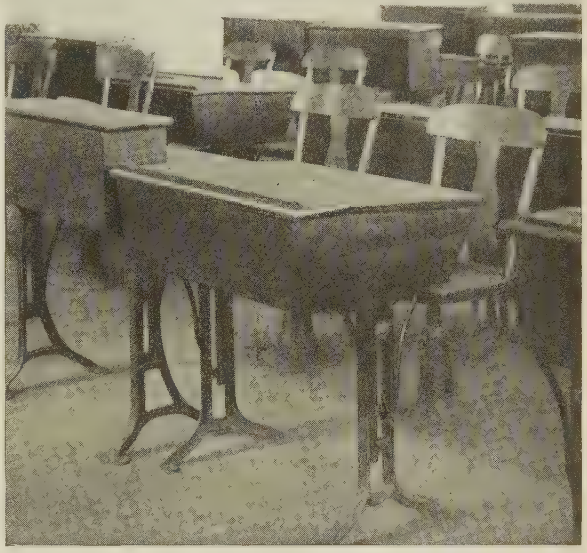

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Reference to the illustrations (see Figs. 41 and 42) will show the possibility of improvement in carriage under supervised exercise. The results of treatment in a case of slight lateral curvature in a school girl whose defect was discovered by medical examination in school and given special treatment

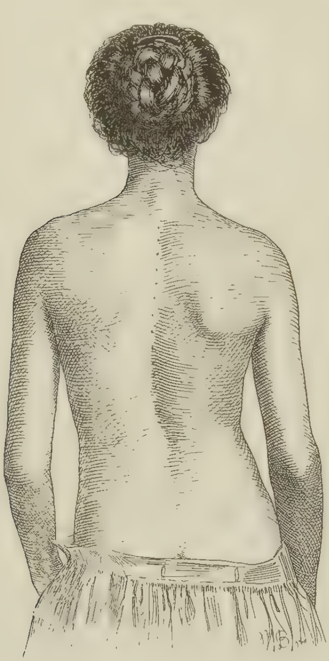

Fig. 43.—A Case of Slight Lateral Curvature of Spine in a School Girl Detected by School Physical Examination.

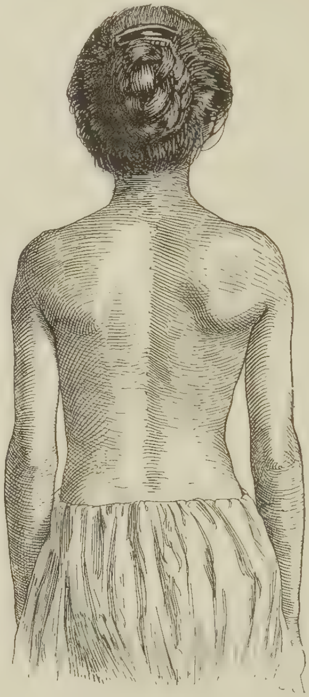

Fig. 44.—Same Case as that Shown in Fig. 43 after One Month's Systematic Exercise.

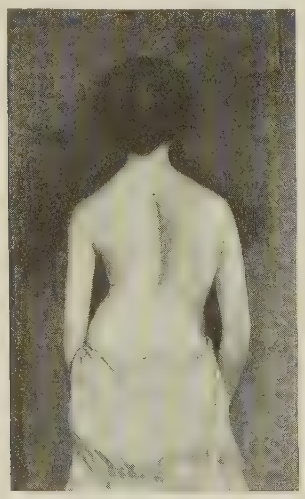

Fig. 45.—A Case of Severe Lateral Curvature of the Spine in a School Girl.

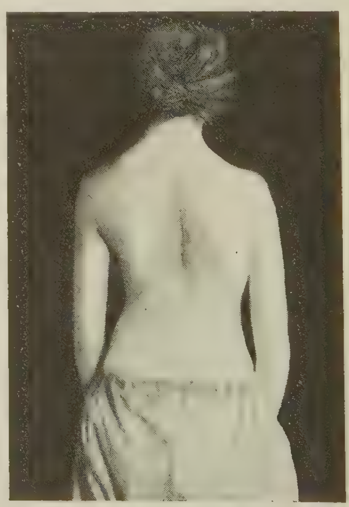

Fig. 46.—Same Case as that Shown in Fig. 45 after Three Months' Daily Exercise.

of the kind suggested, is shown in Figures 43 and 44. Similar improvement in a severe case is shown in Figures 45 and 46.

School Life in Its Relation to Puberty.—It is useless to concentrate attention upon one period of a girl's life and to attempt by over solicitude at this time to remedy the effects of early mistakes in hygienic living and hereditary tendencies. It is unreasonable to anticipate normal puberty in the weak, poorly nourished, and imperfectly developed girl who has been permitted to violate the laws of health throughout childhood. The advantage of a good physical start in life is most apparent at the age of sexual development. The physiologic demands upon the growing girl are greatest at this time. That the period from twelve and a half to fourteen and a half years in girls is that of greatest increase in height and weight is indicated by the following tables:

TABLE SHOWING RATE OF INCREASE IN WEIGHT OF GIRLS FROM AGE OF 6½ to 15½ years. Frederic Burk, *Am. Jour. Psych.*, April, 1898

SEVERAL THOUSAND OBSERVATIONS.

AGE.	Average for each age. In pounds.	Absolute annual increase. In pounds.	Annual increase Per cent.
6½	43.4	....	....
7½	47.4	4.3	9.9
8½	52.5	4.8	10.0
9½	57.4	4.9	9.3
10½	62.9	5.5	9.6
11½	69.5	6.6	10.5
12½	78.7	9.2	13.3
13½	88.7	10.0	12.7
14½	98.3	9.6	11.9
15½	106.7	8.4	8.5

TABLE SHOWING RATE OF GROWTH IN HEIGHT OF GIRLS FROM 6½ to 15½ years. *Rep. U. S. Com. of Ed.*, 1896–97. Franz Boas.

NUMBER OF OBSERVATIONS 4,000.

AGE.	Average height for each year. Inches.	Absolute annual increase. Inches.	Percentage annual increase.
6½	43.3	....	....
7½	45.7	2.4	5.5
8½	47.7	2.0	4.4
9½	49.7	2.0	4.2
10½	51.7	2.0	4.0
11½	53.8	2.1	4.1
12½	56.1	2.3	4.3
13½	58.5	2.4	4.3
14½	60.4	1.9	3.2
15½	61.6	1.2	2.0

That strength does not keep pace with muscle growth is shown by the falling off in strength tests, and is plainly indicated by the careless carriage and awkwardness of many girls at this age. Inability to give fixed attention to work and listlessness, demonstrate accompanying mental inertia. The school curriculum should take cognizance of the physiological and psychical changes going on in the pubescent girl. Under twelve years the pressure and stimulation of the school are of little consequence to the normal girl. She is not likely to respond mentally in a way harmful to her health, but in the following years the demands of the present school will contain factors unfavorable to her best development. Henderson in his " Education and the Larger Life " has expressed the conditions well when he says: " The lower schools would be good if the high schools would let them, and the high schools would be good if the colleges would let them, and the colleges would teach the knowledge of most worth, if the community would let them. Apparently, it is a superior madness which drives us." Whatever harm educational methods of this high pressure system inflict upon a girl's health, close observation of girls in college and in preparatory schools certainly places the responsibility upon the preparatory schools. School work must be adapted to the capacity of the average girl, not to the ability of the exceptionally gifted.

The school, however, is frequently held responsible for the ill health of individual girls, when it has really furnished the only favorable environmental conditions under which they have lived. B. Sachs finds the chief causes of break-down in school life are the tendencies of parents to force a child to keep up with other children who are mentally or physically stronger and in the conditions of life in homes and in society. " Mental fatigue," he says, " is no more a morbid symptom than physical fatigue, provided it be transitory and be recovered from promptly after a short period of relaxation. It is the school alone which in our American life exerts the slight restraining influence which our children need above all else."

To what extent the injurious consequences which may reasonably be ascribed to school conditions manifest themselves by disturbances of menstruation is a difficult question to answer. Certainly the amount of menstrual disturbance occurring among school girls has been much over-estimated. Engelmann has tabulated five thousand cases of beginning menstruation and finds about sixty per cent with more or less menstrual pain. Chapman thinks that fully seventy-five per cent of girls would give a history of painful menstruation. Clark says, " The menstrual function should, of course, occur painlessly and with perfect periodicity, but it is quite rare to find this function unattended with some discomfort and very frequently there is the most intense cramplike pain, which totally incapacitates the patient for one or more days before the onset of the flow and for one or two days after it is established." These figures are not corroborated by a study of the menstrual history of a group of school girls under medical supervision for several years preceding and following puberty. Such a study shows that in about seventy-five per cent of school girls normal menstruation occurs. In a representative group from a private school only twenty-five per cent reported habitual discomfort. Fifty-six per cent of these, or fourteen per cent of the whole, remained away from school regularly one or two days; thirty-six per cent of these, or nine per cent of the whole, had sufficient pain to go to bed for one or two days. Statistics of girls of the same grade in public schools, the girls being less likely to report slight discomfort, show still smaller percentages.

Summary.—The best physical development of the growing girl demands: (1) More rational home care and training throughout childhood and youth; (2) school conditions which furnish every facility for healthful life and growth, best secured by a wide extension of an effective system of medical inspection and sanitary supervision; (3) compulsory physical training in the schools; (4) revision of the curriculum of preparatory schools to relieve the pressure of school work.

HYGIENE OF PUBERTY AND HYGIENE OF OCCUPATION.

Hygiene of Puberty.—Reference has already been made to the necessity of recognizing the years marking the advent of puberty in school curricula. It is convenient to take up here more directly a consideration of the personal hygiene of this period. A rational hygiene of puberty must be based upon an understanding of the physiological and psychical changes which the girl is undergoing. It is a period for wise direction and sympathetic guidance. All the resources of physical and moral education must be brought into play to establish right habits of living, for the future woman is moulded at this time. The physiology of fatigue is too obscure at present to determine with scientific exactness the amount of work, mental or physical, which may be taken as a safe standard for the normal girl with average mental capacity, but it is certain that from her twelfth to her fifteenth year she should have the benefit of any doubt, and the school and home should require too little rather than too much. Strain and stress of emotional life, in especial, must be avoided. Much of the re-education needed as a therapeutic measure in the treatment of the psychasthenia of adult women will become unnecessary when the girl is properly educated at this age in the home and in the school.

Nutrition.—This is a point which requires close attention. Diseases of malnutrition common at this period depend as often upon improper food as upon insufficient food. Rich and poor may suffer equally; the one from overfeeding and improper feeding, the other from lack of food. A plain, mixed diet taken at regular intervals must be insisted upon. Patience and perseverance on the part of mothers, with cordial coöperation between mothers and teachers, will be required in this matter of diet. Girls frequently suffer from the dietetic errors, dietetic fads, and dietetic neglect of the family table. It is as easy to teach them to eat good plain food at regular intervals as it is to teach them to read good books. The school hours of the child and the business hours of the father may conflict, but the home must meet the difficulties.

The importance of a knowledge of dietetics in relation to health and growth cannot be urged too strongly upon the general practitioner. Mothers and young girls need very definite instructions as to the kind of food to be taken and its quantity.

It must not be forgotten that the processes of nutrition involve the excretion of waste as well as the in-take of new material. The care of the health of the growing girl involves the prevention and often the cure of constipation as well as attention to the demands for evacuation of the bladder.

Exercise.—Exercise in the open air, after nutrition, is the greatest hygienic need of puberty. The necessity and use of systematic gymnastic work under medical supervision as an essential part of the school education has already been insisted upon, but this work in the gymnasium cannot take the place of exercise in the open air. The school and the home should provide for out-door sports and games. Tennis, golf, hockey, basket-ball, rowing, swimming and skating are all particularly useful for the developing girl. All sports into which the spirit of competition enters should be carefully guarded. The value of inter-school and inter-collegiate athletics for girls is extremely doubtful, as excessive physical and mental strain cannot be avoided. The athletic ideal is not to be aimed at; what is required is to cultivate a desire for the pleasurable satisfaction that comes with healthy fatigue of the muscles by work in the open air. Among all exercises great stress should be laid upon walking; girls should acquire a love for brisk cross-country walking. Care in advising exercise and athletics must be observed; neurotic girls, girls with heart lesions, anemia and other physical disabilities must be kept off basket-ball teams, tennis tournaments, and other games where excitement runs high. Physical trainers cannot be trusted to judge of medical conditions, and family physicians are frequently at fault. This matter of exercise in the open air should receive careful attention from the family physician; offhand advice to refrain from some particular exercise, or advice to strenuous exercise not adapted to the individual girl often work irreparable harm. The general practitioner should be familiar with the physiology of exercise, with the methods of physical training used in the schools, with the nature of the various athletic games and their adaptation to the needs of the individual girl. He should be able to give definite directions as to the kind of exercise to be taken and its amount. It is his duty before prescribing exercise for any particular girl to make a thorough physical examination, and before advising against exercise to examine most carefully into the life and habits of the girl for causes for her complaints rather than to ascribe them to systematic exercise.

Rest and Sleep.—Eight or nine hours should be the minimum requirement for sleep, and this should be taken in a well ventilated, clean room.

Alcoves, recesses, dark rooms, corners, are unsuitable places for beds. Girls quickly acquire the habit of sleeping with all the outside air they can get, irrespective of its temperature, and the windows of the bed-room should be freely opened at all seasons of the year. The bed clothing must be sufficient for warmth, but light in weight. Single beds should be provided. Simplicity in the furnishings of the bed-room and scrupulous cleanliness are to be aimed at. Bare floors with rugs easily cleaned, washable curtains and hangings, and walls easily renovated are desirable. With a better understanding of the relation of dust to disease we may look for great modifications in the popular standard for the furnishing of bed-rooms, in which approximately one-third of life is spent.

Employment at Home.—The time available for exercise in the open air is interfered with by many unnecessary exactions upon the girl in the household. What these are would involve a discussion of the whole question of the organization of the household and the teaching of domestic science which has no place here. Household work should form an essential part of the education of every girl; but the unnecessary and thoughtless demands made upon the growing girl in poorly organized households are part of a bad moral and physical training.

Long hours of practice on the piano must be avoided. The posture, if long-continued is bad, the confinement is bad, and the attempt at prolonged attention is bad. If skill in the use of musical instruments can be acquired only by long consecutive sittings, then, for the average girl, a choice must be deliberately made between music lessons and good health. A reform in the method of teaching music, especially the piano, is much needed.

Sewing on the machine for long consecutive periods is objectionable for precisely the same reasons. Long-continued standing for any purpose is also harmful. Frequent changes of posture give most favorable conditions for a normal pelvic circulation.

Bathing.—The bathing habit, if not already established, must receive attention. The bath for cleanliness and the bath for stimulation should be enforced. Most girls must be taught that the minimum of cleanliness requires a full bath at least twice a week with soap and warm water, and at the least, daily attention to the exposed parts of the body, to the axillæ, the external genitalia, and to the feet. It is curious to note how averse mothers are to the use of soap in care of the face of the girl for fear of its effects upon the skin, when they cheerfully acquiesce in its necessity for the delicate skin of the baby. It is difficult even in acne to enforce proper cleanliness of the skin of the face.

Most girls, too, must be taught the value of a cold bath as a part of the morning toilet, in the form of a plunge, a sponge, or a shower, with brisk friction subsequently. Such a bath should follow any form of active exercise. Baths other than these referred to belong to the resources of hydrotherapy and ought to be taken under medical supervision.

Clothing.—At the establishment of puberty with the development of the physical characteristics of the woman, the child's clothes are replaced by those of the adult. A woman's clothes are the despair of the hygienist. The dictates of fashion pay slight attention to the physiological demands of clothing. Tight collars, tight corsets, heavy skirts supported by the hips and waist, shoes too small and badly shaped, and a total disregard of the use of clothing in the maintenance of body temperature characterize the dress of the so-called "well-dressed" woman. With such standards before her, with the awakened desire of making herself attractive forcing itself upon her consciousness, the difficulties of adapting the dress of the pubescent girl to her hygienic needs are well-nigh insurmountable.

Rebellion at first against the corset is strong, but she accepts it, adapts her feelings to it, and finally defends it. In a thousand measurements of women and girls, showing a constriction of the waist varying from one to five inches and more, one single woman in the series could be brought to acknowledge that her corset felt too tight. While opinions as to the causal relation between the corset and pelvic congestions, movable kidney and enteroptosis in women differ, there is no doubt, as Glénard has shown, that the corset produces artificially, while it is worn, the dislocations of the organs brought about by other causes. This is well illustrated by reference to the diagrams (see Fig. 47). As an article of dress for the girl the corset must be looked upon as distinctly prejudicial to health, and as entirely unnecessary. Other more hygienic garments may be made to give whatever support the bust needs.

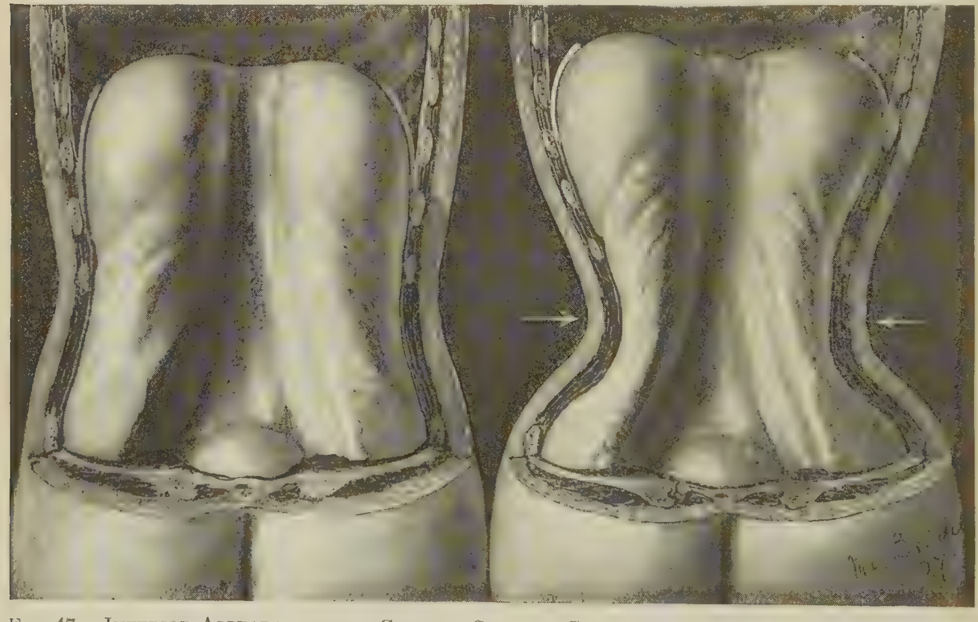

FIG. 47.—INTERIOR APPEARANCE OF A CADAVER SHOWING CONSTRICTION AND DISPLACEMENT DUE TO CORSETS. (From forth-coming "Surgery of the Kidney," by H. A. Kelly.)

The weight of clothing and its support should be regulated. The weight of skirts should be kept at a minimum. It is a rule to which few exceptions are found that the entire weight of women's skirts is supported from the waist—and yet the reasons for supporting a woman's clothes by the thorax are greater than those demanding such support for the little girl. The clothing sold in the shops represents the habits of the community, and the impossibility of buying suitable garments for girls of sixteen shows how early the women's clothes with their disadvantages are forced upon the girl.

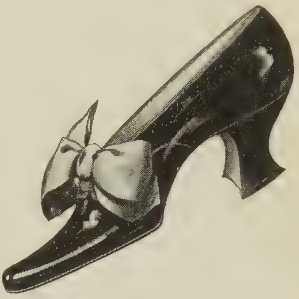
Fig. 48.—Shoemaker's Walking Shoe for Girls.

A properly fitting shoe is necessary for the support of the body, for correct carriage, and for the maintenance of the integrity of the arch of the foot. The shoe of the average young woman is too small, while its shape is grotesque and absurd (see Fig. 48). Its size, its shape and its heel interfere to such an extent with the mechanics of support and with the circulation as to make it both a direct and indirect cause of local injury and of remote disturbances of the general health. No reform in woman's dress is more

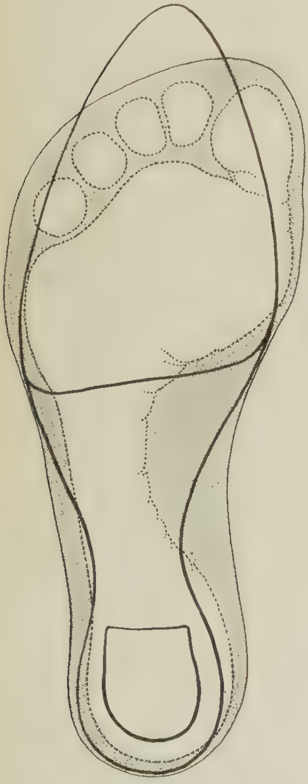
Fig. 49.—Impression of Foot of School Girl with Outline of Shoe Worn.

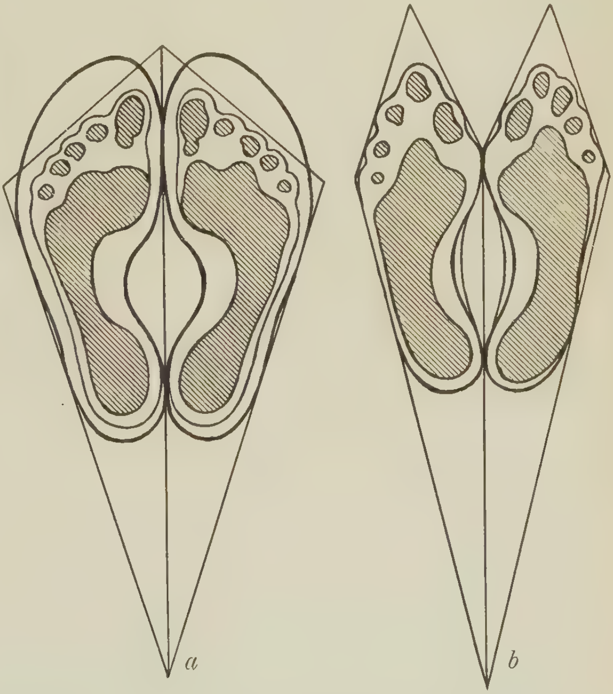

Fig. 50.—(*a*) Proper Soles for Normal Feet. (*b*) Shoemaker's Soles (Whitman). (From W. L. Pyle, "Personal Hygiene.")

urgently needed than an adaptation of the shoe to the function of the foot. Figure 49 shows the relation between a foot of normal shape and the shoe into which it is commonly forced. Figure 50 shows shoes adapted to the shape of the foot and the proper fulfilment of its function as a means of support to the body.

Instruction of Growing Girl in the Physiology of Reproduction.—All women who have the care of growing girls in the school or in the home should have an intelligent knowledge of the physiological changes going on in the developing girl. They should have the ability to teach girls in some proper way before the first menstrual period a few simple facts about reproduction, and the very little that is known about the significance of the menstrual flow. Such instruction will be of benefit to girls morally as well as physically. There is little doubt that the ignorance which envelops this whole subject for the average mother and teacher, and the secrecy maintained about it, result in great harm to the mind and body of the developing girl. Sexual information girls get in plenty, but the sources from which it is obtained are too often ignorant and vicious servants and companions, obscene literature, and bad advertisements. There is no real difficulty in giving the necessary instruction in a helpful way, provided it is given with knowledge and sympathy by a woman who has the affection and confidence of the girl. This is a part of the education of the girl that preëminently belongs to the mother, but, unfortunately, for the present at least, this teaching must be relegated in most cases to the schools, and therefore teachers should be properly instructed. The general introduction of the study of biology into high school courses and into those of teachers' training schools is making women teachers familiar with the great facts of organic reproduction, and the difficulties of giving them adequate instruction in the physiology and hygiene of the reproductive system have practically disappeared. The nature study now common in most schools will make the task of instructing girls of thirteen comparatively easy, provided the teacher has tact and knowledge.

Great care must be taken not to direct the attention of the girl to her sexual organs, nor to sexual things. It is for this reason that an active life out of doors with many varied interests outside of herself should be encouraged. Her reading must be carefully guided. Introspective habits should be discouraged, and an objective life cultivated.

Hygiene of Menstruation.—The periods of the menstrual flow in the healthy girl require no marked deviation from her normal hygienic habits. Great cleanliness of person and of clothing must be enjoined, in opposition to the prevalent idea that bathing and changing underclothing must be avoided. The daily bath must not be intermitted; a cold sponge bath may be substituted for a cold plunge, but there is no necessity for changing the habit of daily bathing, while the underclothing requires more frequent changing than at other times. Girls should not be taught to use a vaginal douche after each menstrual period.

The diet should be plain and unstimulating, in other words a diet suitable for a girl at any time may be taken during the menstrual period. There are many fanciful ideas about the effect of various articles of food upon the menstrual flow, but there is no evidence that, in the normal girl, the function is affected by using any particular article of diet.

Excessive exercise should be avoided. Many women take habitually the same amount of exercise, and teachers of physical training, who do not suffer from dysmenorrhea, make no difference with their systematic exercise, apparently with no ill effects. Some healthy girls habitually rest a day or two at the menstrual period because they have been taught to do so, but unless there is marked dysmenorrhea, this is not necessary—on this question of rest during the menstrual period nothing has been added to our knowledge to vitiate the conclusion drawn by Dr. Mary Putnam Jacobi in 1875 ("The Question of Rest for Women during Menstruation"). She says, "There is nothing in the nature of menstruation to imply the necessity or even the desirability of rest for women whose nutrition is really normal. The habit of periodical rest in them might easily become injurious. Many cases of pelvic congestion developed in healthy, but indolent and luxurious, women are often due to no other cause."

The treatment of the disturbances of the menstrual function will be discussed in future chapters, but it may be permitted here, in discussing the hygiene of the growing girl, to emphasize the necessity of extreme care to avoid the suggestion of pelvic disease to the young woman or to the growing girl. Unfortunately, the possibility of giving or withholding the suggestion is not often in the power of the physician. The teaching of gynecology twenty-five years ago, with the constant pelvic examinations, local treatment with douches, tampons, etc., dilatations and curettage for "the moral effect" has fixed pretty firmly in the minds of women the idea that the most frequent source of ill health of girls is to be found in the pelvis. A prominent gynecologist of a generation ago told his patients that if a woman knew the danger she was in from her pelvic organs she would not step from her carriage to the pavement; the effect of such teaching upon practitioners and patients has been harmful in the extreme. It has been hardly possible in the present generation for a neurotic or hysterical girl, or one suffering from malnutrition, to reach the age of seventeen without having passed through some more or less prolonged gynecological treatment by the general practitioner, or, if she has avoided the physician, without having used largely the various nostrums or local applications of the patent medicine venders. It is difficult even for a healthy girl to rid her mind of constant impending evil from the uterus and ovaries, so prevalent is the idea that woman's ills are mainly "reflexes" from the pelvic organs. If symptoms are suggestive of pelvic disturbance a young woman should be examined under an anæsthetic. Local treatment should be avoided unless absolutely necessary. On the other hand, pelvic examination when symptoms point to its necessity, must not be postponed by considerations of false delicacy. Here again women suffer from the secrecy which, for them, has surrounded all the phenomena of reproduction.

Hygiene of Occupation.—The relation of the school to the health of the girl during the school-going period (eight to seventeen) has been fully considered, but as there is an increasing tendency to prolong the education of girls beyond the high school, and since many girls leave school before the age of seventeen, a discussion of the hygiene of the growing girl would be incomplete without a reference to the conditions favorable or unfavorable to her health in the environment in which she finds herself subsequent to her withdrawal from the secondary school. This involves a discussion of the relation to the health of girls and young women, (1) of industrial life, (2) of the social life of the leisure classes, (3) of college life. This part of the subject may be conveniently referred to as the hygiene of occupation, using the phrase with another than its usual hygienic significance.

Occupation both mental and physical is a physiological necessity for girls and women; some regular and systematic work, whether in the household or outside of it, contributes to their health, while the lack of it is one of the most frequent sources of ill health among unmarried women. It must be remembered that occupation should be interesting and should not require excessive physical or mental strain. More women probably suffer in health from lack of work than from its effects. Occupation is harmful to health, if the external conditions under which work is done are unhygienic, or if by its nature it requires too great an expenditure of energy or too prolonged attention. Women too often hold occupation responsible for bad effects upon the health which are really due to the faulty personal hygiene of the worker.

Influence of Industrial Life upon the Health of Women.—The agitation of the question of child labor in the last few years has revealed conditions for young girls some of which are inhuman and intolerable—they are so bad as to be absolutely defenceless from social and economic reasons irrespective of health, and reform will come, though perhaps slowly, that will make it impossible to exploit the work of a girl who has not reached the age of puberty. The special dangers to health of various individual occupations cannot be taken up here. Considerable experience with working girls demonstrates that the ill effects upon health due to external conditions are: (1) Long confinement in-doors in superheated, badly ventilated, dirty rooms; (2) work permitting little change of posture and enforcing either long-continued sitting or standing; (3) contact with unhealthy work companions suffering from tuberculosis or other infectious diseases. These conditions are common to the poorly paid unskilled laborer and to the skilled. Clerks in offices and teachers in schools are often under worse conditions for their health than factory girls. The remedy for these conditions will never be effective until all places of employment for women are under rigid inspection of a competent health department with power to enforce sanitary conditions. This inspection should eventually include employment at home and conditions under which domestic servants live. Among the various results that have grown out of the campaign against tuberculosis has been the institution by great employers of labor here and there throughout the country of the physical examination of employees in industrial establishments. There is every reason to look for a gradual extension of medical inspection to all those who work in close contact with each other, with the resulting improvement in personal and general hygiene which always follows systematic medical inspection of special classes.

The health of the working girl suffers too often from faults of personal hygiene. Malnutrition due to insufficient and improper food is among the most frequent causes of ill health. Either no breakfast, or a hasty breakfast of bread with coffee or tea, no luncheon or an insufficient one, with fatigue often so great that no supper is eaten, is a frequent history of these cases, if the physician persists in getting at the personal habits. Coffee and tea may be the chief dietary. Tonics prescribed for the working girl who needs food, and recreation out-of-doors give little result. Many working girls spend money for drugs, prescribed by physicians, pharmacists, and friends that ought to be used for buying food. The education of the working girl, too, as to the relation of food to energy, and of the kind and quantity of food she needs is important, but the kind of food she needs must be easy to get, or she goes without it.

Constipation, too few hours of sleep, and these spent in rooms occupied by several others, with no ventilation, are, with faulty diet, and unhygienic clothing, the principal causes of bad health among working girls which they can, in a measure, control. In so far as her occupation increases these faulty habits common to rich and poor alike, so far her occupation is responsible for her ill health, in addition to the bad environment of shop and factory. Shorter hours, with encouragement in simple out-door recreations, and more ample provision for these would bring about great improvement in the average health of the working girl.

Influence of Social Life upon the Health of Women.—The life of the young woman of the leisure classes whose school education is completed at sixteen or seventeen is too often distinctly unfavorable to her health. It is tacitly understood, though not always consciously expressed, that for four or five years her main function is to make herself attractive and to enjoy life, acquiring irregularly and incidentally some knowledge of the management of a household. Her standards of attractiveness, and her standards of pleasure usually have no hygienic basis. The exactions of an active social career under the most favorable conditions are unquestionably a source of excessive physical and emotional fatigue. Indolence alternates with over-stimulation, intellectual activity is in abeyance, the desire for entertainment and excitement is insatiable, physical exercise is irregular, lacking, or excessive, and clothes are used for ornament according to the dictates of fashion without considering the needs of the body. The necessity for rest and for sleep is disregarded. The poor try to keep pace with the rich. It is in this exclusively social life that the foundation is often laid for the ill health of adult women which is frequently and carelessly attributed to "over-education."

Influence of College Life upon the Health of Women.—The effect of college education upon the health of women has been the subject of much discussion in medical and in general literature. These discussions have been obscured usually by the loose way in which the phrase "higher education" has been used to designate any kind of school education from the high school to the university. It seems now generally conceded that as much education as a girl may get in the schools before her seventeenth year is not only not harmful, but if given under proper conditions, is distinctly favorable to her health. An examination of the arguments upon which injury to health of women is predicated as a result of education beyond the high school finds them based upon the hypotheses: (1) That mental activity is in itself harmful to the health of women (this in recent years is not often suggested); (2) that emotional stress and strain represented by worry and anxiety necessarily accompany the conditions of college life, and bring about such interference with general nutrition as to produce permanent injury, showing itself principally in some failure of the reproductive organs manifested by menstrual disturbances, or, after marriage, by sterility, or failure in the function of lactation. Statistics have been collected designed to show that college life has serious effects upon the menstrual function, upon rate of marriage, and upon the production of children.

The fallacy of the statistical method and the method of the *questionnaire* as bearing upon the subject involved is easy of demonstration, but cannot be discussed here. That a childless marriage, however, or a small family always indicates either sterility on the part of a woman, or lack of desire to bear children is an untenable proposition, though one that too often passes without challenge in current literature. Any physician who has had wide and intimate acquaintance with college women knows that they do not evade, on the contrary, they welcome the duties and responsibilities of married life, and bring to their performance mental and physical attributes from which society and the race may profit.

Obviously, the effect of college life upon the health of the individual girl can be determined only by a knowledge of her physical condition at entrance, her personal and family history, her hygienic habits, the exactions of college life, as well as by continued medical observation during her course, together with a medical knowledge of her subsequent history. If one college community, drawing its students from all parts of the country, may be taken as fairly representative, it may be confidently stated that conditions of college life are distinctly favorable to the health of young women. In a long series of observations in one such community not a single instance of nervous breakdown or chronic ill health has been observed in which the legitimate demands of college life could be considered an essential etiological factor. This point may be illustrated by reference to the frequently quoted statistics of

G. W. Engelmann, apparently showing that college life brings about menstrual disturbances. In the first place, an analysis of more than one thousand histories does not corroborate his figures. Sixty-five to seventy per cent of college women never suffer with dysmenorrhea. Taking two classes giving relatively high percentages for dysmenorrhea of two hundred and thirty-two, sixty-five, or twenty-eight and two-hundredths per cent, had some menstrual disturbance when they entered college; of these, only thirty-two, or thirteen and seventy-three hundredths per cent, had sufficient dysmenorrhea to require a day's rest at each period. Nine of these were otherwise healthy girls that no stretch of imagination could have regarded as injuring themselves by mental and physical over-exertion. Among these nine was the only girl in whom dysmenorrhea increased during her college course, and in no single case was it necessary to consider that college work had any causative relation to the dysmenorrhea.

For the girl with fair health who can enter college "without conditions" there is nothing to fear and much to be gained by prolonging education through a four years' course. Why should it be unhealthful? The girls have regular, systematic employment. They have the mental satisfaction which comes from accomplishing definite, progressive work. The wide elective system makes their intellectual effort pleasurable, since they may choose what interests them and satisfies their desires. Mental work alternates with physical exercise. Their food is well chosen. Their hours of rest and of sleep are usually regulated with intelligence. They have congenial companionship, and they are, for the most part, contented and happy.

General Summary.—The great function of woman is to bear and to rear children. The primary requisite for this is a healthy body. To rear children women need intelligence. Good health and intelligence are not incompatible. Whatever in a final analysis may be shown to interfere with a woman's physical capacity to bear children, or her ability to rear them is, for her, unhygienic.

The health of the growing girl is a result of her heredity and her environment. Her heredity will be more favorable when public opinion makes good health in men and women a primary element of attractiveness, and hence an important factor in sexual selection. Her environment, represented by the family, the school, and the community, will be more favorable when the family secures and applies a better knowledge of personal hygiene, especially of food and its relation to health, growth, and energy; when the school possesses and applies a better knowledge of the physiology of fatigue, physical and mental; when the community acquires and applies a better knowledge of infectious diseases and the means for their prevention.

CHAPTER III.

NORMAL MENSTRUATION AND THE MENOPAUSE.

(1) Normal menstruation: Theories, p. 78. Mechanism, p. 80. Age of first menstruation, p. 82. Duration of menstruation, p. 83. Amount, p. 85. Interval between periods, p. 85.
(2) Menopause: Age, p. 87. Symptoms, p. 88. Local changes in genital organs, p. 88. Hemorrhage, p. 88. Vaginal discharges, p. 89. Care of general health, p. 89.

NORMAL MENSTRUATION.

Theories.—Menstruation is a term used to characterize a discharge of bloody fluid which takes place from the uterus at stated periods throughout the time of sexual activity in the life of women. This definition makes no attempt to deal with the etiology of menstruation, because, though this has been the subject of speculation for many years, our knowledge in regard to it is still quite incomplete.

An understanding of the true nature of menstruation presents certain peculiar difficulties, arising from the fact that menstruation is confined to human beings and some of the higher apes, so that the method of investigation usual in physiological research, animal experimentation, is not easily available. It would not be profitable to enter here upon any detailed discussion of all the differing theories of menstruation; I shall, therefore, content myself with a brief account of three, which seem to me especially worthy of attention.

Two opposing hypotheses have coexisted for a number of years. One of these, of which the chief exponents are Pflüger and Bischoff, holds that menstruation is dependent upon ovulation and coincident with it. According to this view, the Graafian follicle, by its swelling during its development, excites nerve impulses, which, being reflected upon the vaso-motor system, give rise to local congestion. The congestion involves both the uterine and ovarian circulations and in the end produces a hemorrhage from the uterine mucous membrane as an accompaniment to the liberation of the ovum from its follicle. This theory has been modified by Reichert and others, who hold that the hemorrhage which constitutes menstruation takes place because the ovum discharged prior to its occurrence is not impregnated, and, in the absence of any stimulation to further growth towards the formation of the decidua of pregnancy, a retrograde metamorphosis takes place in the uterine mucous membrane, accompanied by a discharge of blood. This theory seems in opposition to the fact, observed in my clinic, that with the discharge of blood the mucosa reaches its fullest development.

The opposite view, of which Riegel is the chief exponent, maintains that ovulation and menstruation are two entirely independent functions; that the discharge of the ovum may take place at any time and without any reference to the act of menstruation. In support of this theory it is urged that menstruation sometimes continues after the removal of both ovaries; and further, that conception has been known to take place in women who have never menstruated, or have done so only a few times, at periods remote from conception. Moreover, as I have seen in many instances, women sometimes pass from one pregnancy to another without menstruation. Some of these objections the supporters of the opposite view answer by calling attention to the fact that menstruation after the removal of the ovaries, persists, in almost every instance, for but a few months, and can then be explained by long-established habit. In the cases where it has continued permanently, there is good reason to believe that some ovarian tissue has been left behind; it is never due to a mythical third ovary. An argument of much greater significance is the occasional occurrence of conception at dates known to be independent of menstruation. It is possible, however, to reconcile the two conflicting views by the supposition that although menstruation is not dependent upon ovulation, some relation exists between them by which they are, as a rule, coincident; conception, therefore, takes place in the majority of cases, near the time of menstruation, but if the relation between the two is disturbed, it may occur at some date entirely unassociated with menstruation. This represents the point of view held by some persons at the present time.

In addition to these theories as to the relation of ovulation and menstruation, a new view was promulgated about four years ago by L. Fränkel, who claims that the act of menstruation is governed by the corpus luteum. Fränkel, in his account of his theory, ascribes the idea to Gustav Born, who reckoned the corpus luteum among the secreting glands and attributed to it the function of stimulating the uterine mucous membrane to receive the ovum and foster its further development. Fränkel, in considering this view, reached the conclusion that if it were true, the influence of the corpus luteum over the implantation of the ovum (nidification) is only one part of a much more extended function, and he instituted investigations along this line.

He first proved by experiments on rabbits that if the corpus luteum was destroyed by means of the galvano-cautery shortly after the ovum was fertilized, the ovum failed to enter the uterus, or, if the destruction was delayed until the ovum had had time to enter the uterus, it failed to develop. A further set of experiments showed that destruction of the corpus luteum was accompanied by atrophy of the uterus, one process being in direct proportion to the other. If, as these experiments seem to demonstrate, the corpus luteum is responsible for the nutrition of the uterus, and, incidentally, for the attachment and development of the ovum, the next question in logical sequence is: What is the relation of the corpus luteum to menstruation? If destruction of the corpus luteum occasions atrophy of the uterus, it ought to cause suppression of menstruation.

In order to elucidate this point, Fränkel made use of certain celiotomies, performed for such purposes as ventro-fixation when the pelvic organs were healthy. In nine such cases he destroyed the corpus luteum and waited to observe the effect upon the next menstruation. In five out of the nine, menstruation was completely suppressed for a period varying from three to eight weeks after the time at which it was expected. In three of the remaining four cases, there was a slight bloody discharge from the genitalia a few days after the operation, which the patients themselves interpreted as menstruation; Fränkel, however, thought it more probable that it was nothing more than the bloody discharge accompanied by pelvic pain which is often observed after abdominal operations of any kind, especially as in each instance the regular menstrual period did not appear at the expected time, being delayed until eight weeks after the operation. In only one case, therefore, out of the nine, was menstruation unaffected, and a single negative instance out of so large a number can probably be explained by some special circumstance. Fränkel, indeed, suggests several reasons for the exception; for instance, the corpus luteum may not have been entirely destroyed; or there may have been a double ovulation; or the secretory activity of the corpus luteum had already proceeded so far that the necessary stimulus to menstruation had been given.

In conclusion, Fränkel offers the following suggestions as to the working of his theory: The uterus, like every other organ in the body, has its own blood vessels, both afferent and efferent. These are not dependent upon the corpus luteum for nutrition, but without it they cannot impart the life energy necessary to induce the hyperemia which, if the ovum is fertilized, leads to the further phases of its development, or, if it remain unfertilized, results in menstruation.

Fränkel has published several communications upon the subject. His principal paper ("Die Function des Corpus luteum," *Arch. f. Gyn.*, 1903, vol. 68, p. 438) is a long and interesting one. It gives his experiments in detail and contains some thoughtful speculations on the relation between pathologic conditions of the corpus luteum and certain morbid conditions of the uterus and its appendages, such as extra-uterine pregnancy, ovarian tumors, and some inexplicable cases of sterility. This interesting theory, so attractive at first sight, is being widely tested, but is as yet far from being substantiated.

Mechanism.—The mechanism of menstruation, as Hirst says, is better understood than the causation. The process of menstruation consists mainly of a diapedesis of blood through delicate capillaries, newly formed in a thickened and congested endometrium, the provision for carrying blood to the membrane being better than that for carrying it away. Some of the newly-formed and delicate capillaries rupture and a discharge takes place. Leopold has given the following description of the condition of the uterine mucous membrane during menstruation:

"The mucous membrane is 8 mm. (0.315 in.) thick, swollen, dark brownish-red, soft almost to liquefaction, but perfectly intact, and separated by a sharply defined boundary line from the paler muscular tissue of the uterus. The uterine glands, which are 0.5 to 0.75 mm. (0.0197 to 0.0296 in.) wide, are considerably lengthened and can be seen by the naked eye. In the superficial portion of the mucous membrane, which is well preserved and only in certain spots lacks its epithelium and adjacent cells, may be seen an immense and enormously hypertrophied capillary net-work, the vessels of which have irregular outlines and lie in the uppermost layer of the mucous membrane." (Quoted by Hirst, "Diseases of Women," second edition, 1905.) Figure 51 shows the changes taking place in the endometrium near menstruation (1) as compared with its normal condition (2).

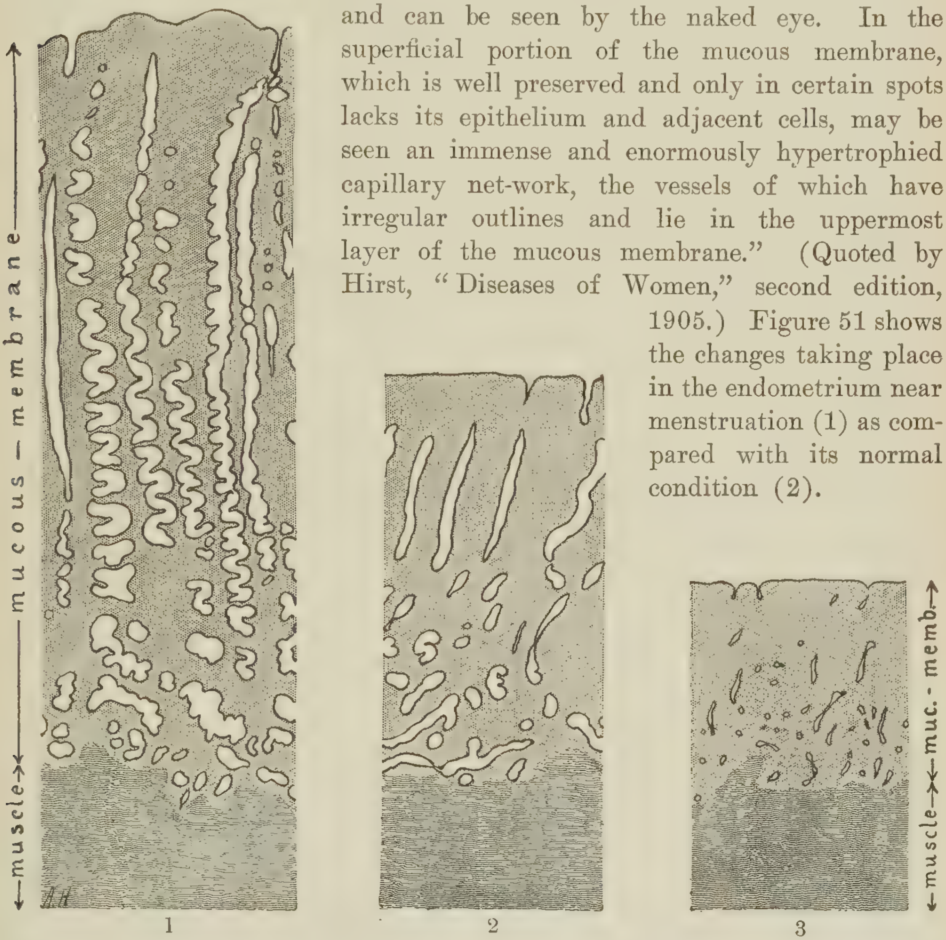

FIG. 51.—(1) NORMAL ENDOMETRIUM OF A PATIENT TWENTY-SIX YEARS OLD, NEAR MENSTRUATION, MAGNIFIED TWENTY-FIVE DIAMETERS. (2) NORMAL ENDOMETRIUM OF A PATIENT FORTY-ONE YEARS OLD, MAGNIFIED TWENTY-FIVE TIMES. (3) ENDOMETRIUM AFTER MENOPAUSE, MAGNIFIED FIFTY TIMES. T. S. Cullen, "Cancer of the Uterus."

Veit, as a result of a study of the uterus during menstruation, divides the changes taking place into three periods:

(1) Premenstrual congestion, in which the capillaries are distended; there is a transudation or exudation of blood into the intercellular tissues, the meshes of which are widened, and an accumulation of blood under the sub-epithelium, which is raised into little hillocks by the sub-epithelial hematomata.

(2) Escape of the accumulated blood through the interstices between the epithelial cells, which are pushed apart; some of them may be carried away

by the blood as it forces its way out. There is also some desquamation of the glandular epithelium.

(3) Post menstrual involution, in which the mucosa shrinks and the extravasated blood remaining in the intercellular tissue is absorbed. The surface epithelium, lifted away from its subjacent tissue sinks again to its normal level (" Handbuch der Gynäkologie," Bd. III).

The gross changes taking place in the genital organs are those belonging to congestive conditions elsewhere in the body. The uterus, ovaries, tubes, and vagina are swollen and darkened in color. The uterus, in particular, is enlarged in size, the mucous membrane is thrown into folds, and the cervix is softened.

At the beginning of menstruation, the flow is composed of mucus streaked with blood, but when menstruation becomes established, the discharge consists of pure blood mixed with a little mucus and epithelial cells from the uterine cavity and the vagina. As the flow subsides it returns again to its mucous character. Menstrual blood is dark in color, alkaline in reaction, and, owing to the presence of mucus, it does not coagulate unless it is excessive in amount.

Age of First Menstruation.—The age at which menstruation first takes place is given by different authorities at from twelve to fifteen. The following averages are taken from different text-books on gynecology: Ashton, twelve to fourteen; Garrigues, thirteen to fourteen; Hart and Barbour, thirteen to fifteen; Hirst, fourteen; Emmet, fourteen; Montgomery, twelve to fourteen; Penrose, thirteen; Gilliam, thirteen. Cases, however, are sometimes met with in which it occurs below or above the extremes of these averages, without being in the slightest degree remarkable. Anything below ten or above twenty, however, must be considered abnormal. Cases of precocious menstruation are nevertheless constantly being reported, and Strassmann has collected fifteen instances where it appeared during the first year of life. It must always be borne in mind that precocious menstruation is frequently the manifestation of some morbid condition of the uterus or its appendages, such as ovarian tumors, myomata, and affections of the endometrium. Riedl has recently reported a case in which menstruation began at two years old and continued regularly up to six years, when the child came under observation. Examination of the external genitalia showed the mons veneris to be covered with hair, as well as the labia, which were well developed. The vaginal outlet admitted the index finger. On opening the abdomen a round-celled sarcoma of the left ovary which weighed two and a half kilogrammes (about five and a half pounds) was found and removed. The right ovary was small in size and contained a few cysts. The uterus was as large as that of a girl of seventeen. Early menstruation, unaccounted for by local lesions, is usually the indication of vigorous sexual activity, which will probably extend over a prolonged period, so that in cases where menstruation is established under the average age, its cessation will, in all probability, be correspondingly late.

The most complete treatment of the subject is by the late George J. Engelmann ("Age of First Menstruation on the North American Continent," *Trans. Amer. Gyn. Soc.*, 1901, vol. 26, p. 77). The conclusions reached are based on 12,402 observations of his own, made upon women of American birth, although in many instances of foreign parentage, covering the territory from Canada to all but the most extreme of the Southern States. To these are added 5,955 observations upon white women and negresses, made by others; to which he adds certain data touching the semi-civilized races on this continent (Indians and Esquimaux), making a total of 19,405 observations upon American-born women. The 12,402 observations made by Engelmann himself represent all phases of temperature and climate from the subarctic conditions of northern Canada to the almost tropical environment of New Orleans, and from the Atlantic coast to the Mississippi valley. In parentage they cover a number of nationalities, including English, Irish, German, and French, only those most commonly met with being given. The conclusions drawn as regards American-born women are, briefly, as follows:

The age of first menstruation in the American-born woman on this continent is 14.3 for the laboring classes, such as are seen in free dispensaries; and 14.2 for the educated classes, seen in private practice. The writer concludes by saying, "Climate has practically no influence; race very little; mentality, surroundings, education, and nerve stimulation stand out prominently in this country as the factors which determine precocity."

There seems to be little, if any difference, between girls of foreign parentage and those who have had American progenitors. It is well known, of course, however, that there exists a wide difference between countries as to the age of first menstruation. For example, it occurs at the age of eighteen in the girls of Lapland and at eight to ten in the aborigines of Australia and in the natives of Southern Prussia, Egypt, Servia, and Sierra Leone. It has always been customary to ascribe this difference between nationalities entirely to the climatic effect of heat in hastening puberty, and of cold in retarding it. Certainly the evidence in the main supports this idea. That there is something to be said, however, in favor of the view that race as well as climate may be concerned, may be deduced from the fact that the Esquimaux of Alaska, where certainly climatic conditions are of a nature to retard rather than to accelerate development, menstruate at the age of thirteen.

As regards our own countrywomen, Engelmann's statistics indicate fourteen years as the average age for the appearance of menstruation. An important predisposing factor in fixing the age in any given case, however, is the customary time for the family. It is always well, therefore, to inquire at what age the mother began to menstruate.

Duration.—The length of the menstrual period varies considerably in different persons. When once the individual standard is established, however, it should remain fixed, and any marked or prolonged variation from it is generally associated with a failure of general health, although it does not necessarily imply the presence of a local lesion. Authorities differ as regards the limits of the menstrual period, and I quote the opinions expressed in several well-known text-books: Ashton, three to six days; Garrigues, four days; Hart and Barbour, two to eight days; Hirst, three to seven days; Montgomery, two to eight days; Penrose, two to seven days; Gilliam, four to five days. In all these cases the statement is made didactically and no statistics are given, nor have I found any figures upon the subject except in the case of Emmet, who goes into the subject in great detail and gives four to five days as the general average. I have collected and tabulated one thousand cases from my private case-books, taking, of course, only the history of menstruation under its normal conditions, before it had been affected by the abnormal conditions for which I was consulted. I give these results in tabular form.

TABLE SHOWING DURATION OF MENSTRUATION IN 1,000 CASES.

1 day	15	4–6 days	112
1–3 days	15	5 “	136
2 “	36	5–7 “	83
2–4 “	59	6 “	68
3 “	105	6–8 “	37
3–5 “	85	7 “	122
4 “	115	7–8 “	12
Total			1,000

It will be seen that the limits in this table are twenty-four hours and seven to eight days. All authorities I have consulted make the shortest duration two days, but the number of my cases which lasted only one day seemed to me quite large enough to warrant taking this as my lowest limit. Again, some gynecologists make the upper limit eight days; my experience, however, leads me to agree with those who consider anything over a week as abnormal. It is so common, however, to find menstruation prolonged a trifle beyond its last complete day that I have included cases lasting into the eighth day.

While collecting these cases, my attention was attracted by the fact that in many of those in which menstruation lasted over six days, it was noted that the flow was more or less in excess of the normal. I made a second analysis, therefore, of 200 cases in which the duration of the flow was over six days, and I found that in 52 of them it was noted as free, while in 68 it was excessive; the whole number in which it was in excess of normal being 120, or six-tenths of the whole. This appears to me strongly suggestive of the fact that a duration of more than six days is so frequently pathologic that it should never be regarded as normal, unless it is clear from other data that the patient's health is fully up to par. If she is anemic, or shows evidence of malnutrition by failure of appetite, or of strength, or of weight, menstruation is probably in excess of normal, even though it has not occurred to her or her relatives that there is anything amiss.

This is the class of cases in which such marked improvement follows a simple curettage, for the performance of which there has seemed but little local indication.

Exclusive of cases such as these, where an excessive flow has become established so insidiously or so early as to be accepted as normal, the duration of the menstrual period which is habitual may be regarded as the proper standard for the individual woman, and if her health does not deteriorate, it usually remains unchanged through life.

Amount.—The amount of blood lost at each menstrual period is extremely difficult to estimate, and cannot, indeed, ever be determined with real accuracy. Different authorities give it as varying from two to eight ounces (60 to 240 c.c.). The usual rough way of estimating it by the number of protectives needed is too unreliable to be any guide as to the actual amount lost, although it is a fairly good way of determining an increase or diminution in any individual case. Most of the blood is lost during the first two days of menstruation, whatever may be the length of the period. For the first few menstrual periods, before the function is well established, the amount often varies considerably, being excessive at one period and scanty at another, but in the course of a few months, as a rule, a standard will become fixed, and this should remain undisturbed during the remainder of menstrual activity. The significance of variations from the established standard in the direction of either excess or decrease will be considered in Chapters VI and VII. I will only say here that any deviation from the normal which lasts more than a short time should be brought to the attention of a physician, who is the only person qualified to judge of its real importance. Variations from the normal in amount or duration are of much more consequence than those which take place in the intervals between the menstrual periods.

Interval Between Periods.—In normal menstruation there is far less individual variation in the intervals between the periods than in either their duration or amount. From time immemorial twenty-eight days has been accepted as the standard fixed by nature, for which reason, no doubt, it has always been believed among uncivilized people that the periodicity of menstruation depends upon the phases of the moon. In this instance statistics agree with common belief more closely than is often the case, and they show beyond any question that the large majority of women menstruate at intervals of four weeks; there is, however, an appreciable number who do so at longer or shorter intervals. I have investigated the subject by collecting and analyzing one thousand cases from my own case-books, with the following results, which I give in tabular form:

TABLE SHOWING INTERVAL BETWEEN MENSTRUAL PERIODS IN 1,000 CASES.

21 days	22	26 days	5
22 “	1	27 “	1
23 “	6	28 “	942
23–25 “	1	29 “	1
24 “	6	30 “	2
24–25 “	2	31 “	1
25 “	9	35 “	1
Total			1,000

Various writers whom I have consulted give twenty-eight days as the interval for the large majority of cases, but they do not, with one or two exceptions, enter into statistics. The exceptions are:

Krieger (“Die Menstruation,” I. D. Berlin, 1869)

28 days	70 %
30 “	13.7%
27 “	1.4%

Hart and Barbour (“Manual of Gynecology,” 1904).

28 days	71 %
30 “	14 %
21 “	2 %
27 “	1+%

Webster (“Text-book of Diseases of Women,” 1907).

28 days	71%
30 “	14%

The preponderance of the twenty-eight-day type is the same in all, but it will be seen that in my list the next highest proportion belongs to the twenty-one-day type, which in Hart and Barbour's list is the third, and is not mentioned at all by the others. Where the proportion is so excessive in favor of any one type it would require statistics covering a good many thousands to establish results as concerns the lower percentages; the main point, however, remains the same in all, namely, that twenty-eight days is the custom for so large a proportion of women that it may be considered as the established rule, although there are constant exceptions to it within the limits of health.

The interval between the periods is sometimes irregular for a little while after menstruation is first established; indeed, there is a general impression, not only among the laity, but among medical men that it is usually the case. Emmet found, however, that out of 2,447 women, 72.33 per cent were regular from the first; 18.92 per cent after a certain period; while 8.74 per cent were never regular (“Principles and Practice of Gynecology,” 3d edition, 1884, p. 147).

Strict adherence to individual habit, as I have said, is not so closely associated with health as it is to the duration of the flow or to its amount, and even after regularity is established, variations of a day or two in anticipation or delay are very frequent and need excite no apprehension.

MENOPAUSE.

Age.—This is the term given to the cessation of menstruation at the close of sexual activity. It occurs, usually, anywhere between forty and fifty-five. Cases are occasionally met with, however, presenting nothing abnormal, where it takes place as early as thirty or as late as sixty, but these are exceptional.

An interesting case of unusually early menopause in an unmarried woman has been reported by Dr. Josephine Walter (*Amer. Jour. Obst.*, 1902, vol. 45, p. 195). In this instance menstruation began at eleven and ceased at twenty-three, after a severe grief from the sudden death of the patient's mother. When the case was reported, twenty-one years had elapsed since the cessation of the function, and during the early part of this time the patient suffered from many of the manifestations which often accompany its cessation. These passed away under judicious treatment and for the last fifteen years she had remarkably good health. At the time the report was made she was forty-two and looked much younger than her age; the external genitalia, instead of showing the changes which commonly accompany the menopause, were like those of youth. After the cessation of menstruation she had lost weight rather than gained.

Different authorities give the age of the menopause as follows: Ashton, forty-five to fifty; Hirst, forty-five; Garrigues, forty-five to fifty; Hart and Barbour, forty-five; Montgomery, forty-seven to fifty; Penrose, forty-five to fifty; Skene, forty to fifty; Gilliam, forty-seven. Webster (*loc. cit.*), who is one of the few writers going into detail on the subject, says, "In temperate countries it takes place in about fifty per cent of women between forty-five and fifty; in twenty-five per cent, between forty and forty-five; in twelve and one-half per cent, between thirty-five and forty; and in twelve and one-half per cent, between fifty and fifty-five."

TABLE SHOWING AGE OF THE MENOPAUSE IN 200 CASES.

30 years	1	47 years	13
36 "	1	48 "	15
37 "	3	49 "	21
38 "	2	50 "	39
39 "	1	51 "	8
40 "	5	52 "	15
41 "	2	53 "	10
42 "	4	54 "	9
43 "	3	55 "	3
44 "	9	56 "	1
45 "	17	57 "	3
46 "	15		
Total			200

My own statistics, taken from two hundred cases out of my private case-books, indicate, so far as they go, a somewhat later limit than the average given by others. It will be seen that the same number of cases (81) occurs between the ages of fifty and fifty-five as between forty-five and fifty, the two classes together making more than four-fifths of the whole. I should state that cases in which the menopause might have been delayed by the presence of myoma or carcinoma have been carefully excluded from the list; indeed, most of the cases included in it consulted me for disorders entirely unassociated with the uterus, as, for instance, renal calculus.

Symptoms.—In some women menstruation continues with its accustomed regularity up to the time of the menopause and then ceases suddenly without any disturbance, either general or local. In the greater number of cases, however, it is preceded by a longer or shorter period of irregularity, extending over a few months or often several years; during this time the patient may be subject to a variety of discomforts, most of them due to disturbance of the vaso-motor system, such as flushes, sweating, palpitation of the heart, and confusion of ideas. The central nervous system is also much affected in some instances and the patient becomes more or less neurasthenic. Occasionally the mind suffers more than the body and there is temporary insanity, but when this occurs there is usually a neurotic temperament and the family history is bad.

Local Changes in the Genital Organs.—During this period local changes are taking place in the sexual organs which lead in the end to senile degeneration. The uterus becomes smaller and its walls thinner; the cervix is shortened and the whole organ is much reduced in size. The mucosa becomes thin, the epithelial cells grow smaller, lose their cilia, and may gradually disappear. The cervical glands are lost and those of the corpus as well to a large extent. The mucous and fibrous elements atrophy, and abundant elastic tissue becomes the predominating element (see Fig. 51 (3), p. 81). The ovaries atrophy, the Graafian follicles disappear, and the whole structure becomes fibrous. The uterine tubes also undergo atrophy, the vagina becomes contracted, and the external genitalia lose their fat. This atrophy of the genital organs is accompanied in most cases by an increase in flesh, a change of the same character as that observed in amenorrhea due to lack of development of the sexual organs. As Skene says, " Atrophy of the sexual organs from impaired nutrition is the anatomical change that directly leads up to the menopause."

Hemorrhage.—The reflex disturbances attending the cessation of menstruation need not, as a rule, excite apprehension; irregularities of menstruation, on the other hand, should never be dismissed as unimportant. So long as they manifest themselves by diminution in the amount of the flow or by infrequency of occurrence they are probably due to the retrogressive changes taking place in the uterus and adnexa, but a tendency to excess in either amount or duration is strongly suggestive of a local lesion, which may be of a most serious character. For many years an idea has prevailed, not only with the laity, but among physicians as well, that a tendency to menorrhagia or metrorrhagia occurring at the menopause is to be regarded as a necessary evil which may safely be left to time. Nothing can be more erroneous or more productive of harm than this point of view. The period of life in which the menopause occurs is that in which carcinoma is most frequent and fibroid tumors attain their largest growth, and the experience of gynecologists during the last twenty years shows plainly that the profuse and frequent menstruation so often observed during this period is, in a large number of cases, caused by either carcinoma or myoma. This subject is considered in detail in Chapter XXI.

Vaginal Discharges.—The appearance of vaginal discharges during the menopause is likewise a matter of considerable importance. It is too much the custom to regard anything of this kind as an unavoidable discomfort. A simple leucorrhea often occurs at this time without indicating anything amiss, although it is better not to pass by even this without attention, but watery, irritating, or rust-colored discharges are strongly suggestive of cancer and should always receive the most careful attention.

It is in the work of the general practitioner that these points are of special practical importance, for it is upon him that the education of the public mind in regard to them depends. Moreover, it is upon his promptitude in detecting cancer in its early stages, or in calling in a specialist to make a diagnosis, that the possibility of a cure, in many instances, must rest. Every year furnishes further statistics showing that if cancer is operated upon early enough, a cure can be effected, and it is upon the prompt recognition of the significance of symptoms hitherto neglected that its early diagnosis depends. In the year 1902 an effort towards the instruction of the public in this respect was made in Prussia, by means of pamphlets setting forth all the facts that were distributed to all physicians and midwives in East Prussia, and this was shortly followed by a " warning to women," published in the daily papers. As a result of these measures family physicians examined their patients on much slighter evidence than had formerly been the case, and women consulted their physicians much more promptly than before. In one year the operability of uterine cancer in East Prussia increased from sixty-two to seventy-four per cent.

Care of General Health.—The care of the general health during the menopause is of the utmost importance. Tonics and alteratives are generally indicated, but there is no special medicine which can be relied upon at that time. Of late years the various gland extracts—thyroid, ovarian, and parotid—have been much tried, with varying results. In some cases they are attended with much benefit, but in others they do little or no good. It is always worth while, however, to give them a trial. In numerous cases of artificial menopause, following operation, observed in my clinic, the use of the dried corpus luteum has been followed by great improvement. It is given in the form of tablets, each of which is composed of a dried corpus luteum, easily obtained from an animal, usually a pig. Fresh air, exercise, attention to the bowels and kidneys, and favorable surroundings are of the utmost importance. Reflex symptoms when they are present must be treated according to the indications. If the nervous symptoms are well marked, it is often the wisest plan to send the patient to some sanatorium or health resort, where she can receive constant attention and be free from the atmosphere of anxiety and petty cares which is frequently to her disadvantage at home.

If we take fourteen as the average age for first menstruation, and forty-eight as that for the menopause, we find that the menstrual function extends over a period of thirty-four years in a woman's life; and if we take four and a half days as the average duration of menstruation and allow thirteen periods to each year, we find that one thousand nine hundred and eighty-nine days in a woman's life are, or at any rate may be, passed in menstruating. Or, to put it in another form, five years, five and a half months. Of course, with a large number of women the occurrence of pregnancy and lactation reduces this calculation very much; still the essential point remains the same, namely, that the healthy performance of the menstrual function is of vital importance to a woman's happiness and to her value in the community at large. If she marries, it is closely associated with her capacity to bear healthy children without detriment to her own health; and if, on the other hand, she remains single, so much of her time must be spent under the shadow of it, that her usefulness and well-being are largely dependent upon a normal condition as regards it.

To define exactly what constitutes a normal status during menstruation is not altogether an easy thing. Among aboriginal people a woman's physical condition is in no way different during menstruation from what it is at other times, but the effect of higher civilization upon the nervous system has been such as to make entire freedom from suffering almost unknown. It would seem that a certain amount of pain and discomfort must be accepted as the routine condition of things for the majority of women, and the question to be answered is, therefore: At exactly what point does suffering become pathologic?

This subject will be discussed more fully in Chapter IV, with the consideration of dysmenorrhea. I need only say here that a certain amount of pelvic pain exists in a large number of women without in any way indicating an abnormal condition of the organs concerned in menstruation or a disturbance of the general health. Reflex symptoms, such as headache, nausea, and a variety of other disturbances, are also present in a good many cases, and within moderate limits they need not be regarded as of consequence; if, however, they exist in any marked degree, they are generally the expression of an over-taxed nervous system, asserting itself at a time when it is capable of least resistance, and plainly demanding relief.

Much of a woman's comfort during menstruation, as well as her health during the intervals, depends upon the care which she, or her friends for her, take during her periods. The measures best calculated to secure the end in view are so closely associated with questions of general hygiene that they are most suitably discussed in Chapter II, which is devoted to the treatment of such topics. The proper steps to be taken to preserve the health of the growing girl during puberty will also be found in this chapter.

CHAPTER IV.

DYSMENORRHEA.

(1) Dysmenorrhea: Definition, p. 91. Menstrual molimena, p. 91. Classification, p. 92. Causes of dysmenorrhea when no pathological lesions can be found, p. 93. Causes of dysmenorrhea associated with gross pelvic lesions, p. 96. Remedies for temporary relief, p. 99. Remedies for permanent relief, p. 103. Dilatation, p. 107.
(2) Membranous dysmenorrhea, p. 114.

Definition.—The name "dysmenorrhea" signifies simply painful menstruation, and is applied without discrimination to all varieties of suffering associated with the performance of the menstrual function. The fact that we are still in the dark as to the etiology of menstruation is a serious obstacle to a better understanding of the true nature of dysmenorrhea. As things stand at present the theories advanced to explain it and the practices employed to relieve it are purely empirical.

Menstrual Molimena.—In any consideration of dysmenorrhea we find ourselves in a difficulty at the outset, from the fact that it is impossible to say exactly what constitutes normal menstruation. Theoretically, a woman in perfect health ought to know no difference between the menstrual and intermenstrual periods, but this state of things exists only among uncivilized people. The effect of civilization, and more especially of the complex conditions of our modern life, has been to intensify nervous excitability to such an extent that the woman who menstruates to-day without pain or reflex disturbances of some kind is altogether exceptional. Entire absence of suffering is indeed so unusual that text-books of gynecology all devote some space to what is called "menstrual molimena," that is to say, those local and general disturbances which it is assumed must habitually attend menstruation.

These disturbances consist of a certain amount of pain, situated in the pelvis and extending through the back and thighs; and of nervous excitability, manifesting itself most commonly in headache, depression, and disinclination to exertion. The symptoms frequently precede menstruation by a period varying from a few hours to a few days; in some cases they are relieved by the establishment of the flow, while in others the suffering is increased by its appearance. The nervous symptoms, such as headache, and reflex disturbances of various kinds, are sometimes more marked than the local suffering. The condition described may be considered as constituting normal menstruation; any marked increase upon the symptoms being pathological and coming under the head of dysmenorrhea.

The constancy with which menstrual molimena occur has been investigated by Marie Tobler (*Monatsschr. f. Geb. u. Gyn.*, 1905, vol. 22, p. 1), who interrogated one thousand and twenty women with this point in view. She found that twenty-six per cent had local pain and both physical and mental disturbance, the term physical disturbance being used to indicate such constitutional phenomena as a sense of general discomfort, of malaise, or of weakness. Four and four-tenths per cent had only local suffering. Fourteen per cent had local and physical, but no mental disturbance; eleven per cent had physical and mental, but no local disturbance; six and nine-tenths had physical, but no local or mental disturbance. Seven and eight-tenths had mental disturbance only; five and six-tenths had mental and local, but no physical disturbance; while sixteen per cent were free from disturbance of any kind. In three and three-tenths per cent the patients felt better than at any other time; while in three and six-tenths per cent they felt better during the period, but were more or less disturbed just before or after it.

The reflex symptoms accompanying menstruation are extremely varied. In addition to headache, which is so common as to call for no comment, pains in the joints are often present, even in cases where no rheumatic or gouty tendency exists. Eye strain is quite common, with marked contraction of the field of vision in some cases, especially when there is a tendency to exophthalmic goitre. Skin eruptions, such as eczema and acne, make their appearance or are increased in virulence. Suffering of any kind to which the patient is subject, either temporarily or permanently, is apt to recur or to be exacerbated with the occurrence of menstruation; for instance, neuralgia in any part of the body is more likely to attack its victim at that time, and even so common a malady as toothache is influenced by it.

Classification.—From the standpoint of the subjective symptoms, dysmenorrhea may be divided into two classes, one, in which the character of the menstrual discomfort is identical with that which we have just defined as normal, but is much more severe; another in which the suffering is not only more severe, but of a different character from that just described.

In the class characterized by increase of the usual suffering, the pelvic pain begins from one to two days to a week before the appearance of the flow. It is of a dull, dragging character, extending all through the back and down the thighs, and is often accompanied by severe headache, occasionally associated with nausea, extreme lassitude, and nervous excitability. In some cases the symptoms are greatly relieved by the establishment of menstruation; in others they continue throughout its duration.

In the second class of cases, the pain begins just before, or exactly with the appearance of menstruation. It is sharp, well-defined, and cramp-like in character, coming on in paroxysms which last a minute or two and recur at short intervals. This form of dysmenorrhea is less often accompanied by reflex disturbances than the other.

There is still another variety of dysmenorrhea in which both types of pain are present, the spasmodic form being superadded to the dull persistent pain and the two being present in varying proportion.

I shall refer again to these two types of dysmenorrhea in the discussion of its treatment; at present I will proceed at once to consider the various theories as to its causation.

CAUSES OF DYSMENORRHEA WHERE NO PATHOLOGICAL LESIONS CAN BE FOUND.

It has long been recognized that dysmenorrhea is not necessarily associated with a demonstrable abnormal condition of the reproductive organs. On the contrary, dysmenorrhea of the most severe and obstinate character may exist in the absence of any discoverable local disease whatever, while some cases of advanced disease in the uterus and appendages are entirely free from pain in menstruation. Various theories have been developed to explain the existence of dysmenorrhea in the absence of uterine or ovarian disease, the most widely recognized of which are the following:

Mechanical Dysmenorrhea.—This theory presupposes a constriction of the uterine canal, by means of which the escape of the menstrual fluid is impeded. It was first advanced by Sir James Mackintosh of Edinburgh and was further developed by Marion Sims and Sir James Y. Simpson. In detail it is based on the assumption that an obstacle is present in the uterine canal, and that in order to force the blood past this obstacle the uterus contracts forcibly, the contraction being realized subjectively in the form of uterine colic and constituting the pain known as dysmenorrhea. The obstacle in question, according to the advocates of the theory, may be: (1) A kink in the cervical canal, due to an anteflexion, or, more rarely, a retroflexion; (2) a stenosis of the internal os, which may be congenital, or the result of spasmodic contraction of the circular muscle fibres at the internal os, or of premenstrual swelling of the mucosa; (3) a congenital stenosis of the external os or of the entire cervical canal; (4) intra-uterine polypi acting as ball valves; (5) clots of blood, or (in membranous dysmenorrhea) a membrane forced into the internal os.

This theory affords a most plausible explanation of the clinical features of many cases of the spasmodic variety of dysmenorrhea, where the pain is sharp and colicky, comes on shortly before the flow, and is associated with scanty menstruation, becoming more free as the pain subsides. It received substantial support from the fact that dilatation of the cervix, which was supposed to remove the obstruction and should, therefore, theoretically, relieve the pain, was, clinically, a perfect success in many cases. These facts caused it to receive a ready welcome, but further experience and a closer examination of the results have to a large extent destroyed confidence in it. Vedeler (*Arch. f. Gyn.*, 1883, vol. 21, p. 211) has shown that out of a large number of women with anteflexed uteri, the percentage of those free from dysmenorrhea is as great as of those who suffer from it. Duncan has pointed out that observation of the section of a uterus in extreme anteflexion shows that the flow of blood along the flexed canal would be obstructed only in a degree which could not practically be of the slightest importance. Moreover, the uterine sound has been passed repeatedly through the internal os during menstruation, showing that at this time the stenosis does not exist. Again, it is estimated that the amount of menstrual blood lost is one drop in three minutes, and it has been demonstrated that menstrual blood flows easily at this rate through a tube much smaller than any possible stenosis of the os, or of the canal. It has also been shown that during the acme of the pain, and just before the flow is established, there is no blood in the uterus at all. In support of the theory it has been urged that when a uterine sound is passed into the nulliparous uterus, resistance is often encountered, but this does not necessarily imply the presence of a pathological stenosis, and careful examination usually shows that the difficulty arises from the tip of the sound being caught in the folds of the mucosa, or from its encountering a flexion.

Dysmenorrhea Associated with Maldevelopment of the Reproductive Organs.—Insufficient development of the reproductive organs is often associated with painful menstruation, but the relation between the two is not yet determined. Some authorities claim that this form of dysmenorrhea is a neurosis; others, that it arises from a deficiency in the calibre of the blood vessels, which are too small to receive the increased amount of blood necessary to establish the menstrual hyperemia; others, again, consider it due to the fact that the uterine cavity is too small to accommodate the swollen endometrium; and still another view claims that anteflexion is present in all such cases, on account of the maldevelopment of the anterior surface of the uterus, and that while the increased blood pressure tends to straighten the flexed organ, the resistance rendered by the lack of distensibility of the uterine parenchyma occasions the pain. None of these explanations can be accepted as satisfactory, and although there is no doubt that maldevelopment of the pelvic organs is an important causal factor in many cases of dysmenorrhea, we are at present unable to say more than that the incompletely developed organ is not capable of prompt, efficient response to a normal impulse, and therefore does not carry out its function with ease, hence the pelvis is not relieved of its increased blood pressure and there is a tendency to stasis. A poor physical development is often associated with a similar condition of the pelvic organs, but maldevelopment of the uterus and adnexa is not necessarily associated with general defective development. Women in robust health, whose only ailment is dysmenorrhea, sometimes present imperfectly formed uteri and ovaries of the puerile type.

Neurotic Dysmenorrhea.—In some instances, dysmenorrhea is undoubtedly a pure neurosis, explicable as a hyperesthesia of the endometrium; in other words, it is an abnormal perception of the uterine contractions physiologically present at every menstrual period, but not usually appreciable, it being supposed that uterine colic is analogous to intestinal colic and due to a tetanic spasm of the circular fibres at the internal os. The pain may be due also to a physiological difficulty occasioned by the breaking down of the mucous membrane of the capillaries which induces a sort of pelvic headache. In dysmenorrhea of this type the patients are not anemic, their functions are well performed, and examination shows their reproductive organs normally developed, so that the dysmenorrhea must be considered as a pure neurosis whose exact nature cannot be clearly defined. It frequently happens that dysmenorrhea will make its appearance during neurasthenia in women who have never suffered from it before. In such cases it is often a nice question how much the dysmenorrhea is the result of the neurasthenia and how much it is occasioned by local disturbance of the organs.

Nasal Dysmenorrhea.—In 1897 Fleiss advanced a theory of dysmenorrhea based on the fact that certain cases could be relieved by the application of a twenty per cent solution of cocain to the so-called " sexual spots " in the nasal mucous membrane, urging in support of his theory that at the time of menstruation these spots increase in size and consistency, become cyanotic, and bleed easily. The theory found some supporters, amongst them J. Mackenzie, but it has never met with general acceptance. A most sensible paper on the subject by G. Kolischer (*Amer. Jour. Obst.*, 1904, vol. 49, p. 804), ascribes the good results observed in certain hysterical patients to the effects of suggestion, and points out that cocainization of other mucous surfaces produces the same effect. For instance, in two cases where relief was promptly experienced after the application of cocain to the " sexual spots," the same benefit was obtained at the next menstrual period from the application of cocain elsewhere, in one case to an erosion of the cervix, and in the other to a previously cleansed rectum.

Dysmenorrhea from General Ill Health.—There is still another variety of dysmenorrhea, common in young girls in whom the menstrual habit is becoming established, and usually associated with a variety of dyscrasias, the most prominent of which are anemia and chlorosis. This form does not usually persist beyond the twentieth year, although it is occasionally met with in young married women. Many of these patients live among poor hygienic surroundings which keep their physical vigor below par; others, on the contrary, are found among the higher classes who live amidst luxurious conditions, but are victims to the overstrain caused by the perpetual rush and excitement of constant social engagements, or the present efforts towards the higher education of women.

These are the principal theories concerning the etiology of dysmenorrhea not associated with gross pathological lesions of the reproductive organs. Other explanations less well recognized are to be noted also. Chronic endometritis, causing pain in menstruation through hyperesthesia of the endometrium is sometimes spoken of, and also chronic ovaritis; but neither of these causes has yet been demonstrated. In sixty-four cases of dysmenorrhea without abnormalities of the pelvic organs, which were treated in my clinic by dilatation and curettage, chronic endometritis was found on microscopical examination in only four cases, and in no one of the four was it well marked. A form of painful menstruation, known as ovarian dysmenorrhea, is sometimes spoken of, in which there is extreme tenderness of the ovary during the period, demonstrated by pressure upon it, and explained by thickening of the ovarian capsule preventing the expansion of the ovary during the period of congestion; it has never come under my observation. Perimetritis and salpingitis are sometimes the cause of pain in menstruation on account of the peritoneal pain occasioned by contractions of the tubes and uterus. Some writers recognize another form of dysmenorrhea known as "neuralgic" which is classed with the pure neuroses as analogous to intercostal or facial neuralgia. Dysmenorrhea is sometimes met with in women of a gouty or rheumatic constitution as a manifestation of the diathesis; its association with the dyscrasia being demonstrated by the entire relief afforded from remedies appropriate to its alleviation. In dysmenorrhea, not otherwise explicable, occurring in women with a rheumatic or gouty history, it should always be borne in mind as a possible cause, even if there are no other manifestations of the diathesis.

CAUSES OF DYSMENORRHEA ASSOCIATED WITH GROSS PATHOLOGICAL LESIONS.

While there are many cases in which a most severe dysmenorrhea is present without the slightest local lesion or displacement, there are also a considerable number where it exists in the presence of some pathological condition, of greater or less significance, by which, there can be no doubt, it is sometimes induced. In order to investigate this matter, I inquired into the histories of one thousand patients admitted consecutively into the Johns Hopkins Hospital, and found that two hundred and twenty-nine of them suffered from dysmenorrhea which was apparently the result of a definite pelvic lesion. The abnormal conditions which may occasion dysmenorrhea are many and various, but the three most frequently met with are: (1) backward displacement of the uterus; (2) pelvic inflammatory disease; (3) myoma. Of the cases spoken of, forty-one per cent were associated with retrodisplacements of the uterus; thirty-seven per cent with pelvic inflammatory disease; and eleven per cent with myomata. The remaining eleven per cent were distributed among various minor conditions.

Retroposition of the Uterus.—Dysmenorrhea is more commonly associated with retroposition of the uterus than with any other abnormal condition of the pelvic organs. An analysis of a number of cases of backward displacements, treated at the Johns Hopkins Hospital, made by my former associate, Dr. G. R. Holden, showed that out of one hundred and twenty nulliparæ, one hundred and nine, or ninety per cent, suffered from dysmenorrhea before operation. In multiparæ, backward displacements are not so frequently associated with dysmenorrhea, there being one hundred and thirteen cases of it in two hundred and two cases of retroposition, or fifty-six per cent. Dysmenorrhea is occasionally the only symptom caused by the displacement, but more often it is only one of a series of manifestations, although, perhaps, the most severe. There is no constant type of dysmenorrhea associated with retroposition; it is more apt to continue throughout the entire period than the dysmenorrhea of nulliparæ without lesion. Gastric symptoms, headache, and other neurotic manifestations are often marked features, owing to the neurasthenia which almost invariably accompanies such cases.

Pelvic Inflammatory Disease.—About one-third of all the inflammatory conditions of the uterus, tubes, or ovaries, acute or chronic, are accompanied by dysmenorrhea. The proportion of cases with menstrual pain is about the same in acute and chronic affections, and the intensity of the suffering bears no relation to the extent of the pathological process. Cases in which the entire pelvic organs are the seat of inflammatory disease may have no pain in menstruation whatever, while a few adhesions binding down lightly one tube or ovary, or both, may give rise to severe suffering. Here also there is no constant type of pain. The suffering usually comes on a few days before the flow and lasts through the entire period. It is commonly dull in character, and is often referred to a wide area over the abdomen, back, and thighs. There may be no symptom of the condition except dysmenorrhea.

Myomata.—During the year 1907 the histories of two hundred cases of myoma in women under forty-five were examined at the Johns Hopkins Hospital to ascertain what percentage of their number suffered from dysmenorrhea. Ninety-four of the cases were white and one hundred and six black. Only those cases were considered positive which "showed the onset of dysmenorrhea with the present illness." Of these two hundred cases of uncomplicated myoma (adeno-myoma not included), twenty-five per cent showed that painful menstruation had made its appearance since the onset of the trouble for which the patient sought advice. This estimate of the proportion of dysmenorrheas associated with myoma may seem low, but another set of investigations carried on at the Johns Hopkins a little earlier gave a percentage of twenty per cent, which is even lower.

Dysmenorrhea is most frequently seen with submucous and interstitial myomata and is rare in the subperitoneal form. Here, again, there is no distinctive form of suffering. Severe dysmenorrhea is most often observed in the case of small tumors, and I pause here to call attention to the fact that a number of apparently inexplicable dysmenorrheas are due to the presence of extremely small myomata. In a case which passed through my hands not long since, the patient had been suffering for some years with extreme dysmenorrhea and more or less constant pain, so that her general health was quite broken down. When the uterus was opened a very small submucous myoma was found and removed, with complete relief of the suffering.

TREATMENT OF DYSMENORRHEA.

An important question which at once arises in almost every case of dysmenorrhea is the propriety of making a local examination. There should, of course, be no hesitation in the case of married women, or in cases of inflammatory disease. But there are many instances of young women who suffer from dysmenorrhea pure and simple, when the question of examination must receive careful consideration. It is always best to exhaust all general therapeutic measures before making it; and, in a large number of cases, if these are carried out conscientiously over a long period of time, the suffering will be relieved. If, however, the case is an aggravated one when first seen; if it persists in defiance of all therapeutic measures; if it cannot remain under observation; or, if the circumstances are such as to prevent the general measures being consistently carried out, an examination should be made under an anesthetic.

With this precaution, an examination can be made without injury to the hymen, while, should any simple operation such as dilatation and curettage be indicated, it can be performed at the same time. Such a course enables the physician to dispense with the endless local treatments which are so objectionable in young women.

The various remedial measures which experience shows to be beneficial are as follows:

GENERAL REMEDIAL MEASURES.

Attention to General Health.—In all cases of dysmenorrhea the closest attention to general health is indicated. In a large proportion of cases the patient will show more or less evidence of malnutrition of some kind or other, and this should be the object of persistent attention. A proper quantity of nutritious food is essential, and if, as often happens, the appetite is so impaired as to make it impossible to consume this at ordinary meals, the deficiency should be made up by feeding the patient in small amounts at frequent intervals. A glass of milk, a cup of beef tea, a sandwich, some malted milk, or any light nutritious food taken between meals and just before going to bed will generally be sufficient, and as the general condition improves, the appetite will increase.

Sleep.—A case of the kind under consideration should always have fully eight hours' sleep and more, if possible. In young girls who have not attained maturity, or in cases where the patient is markedly anemic, there must always be more, either at night or in the day time. An excellent plan is a sleep of one or two hours in the early afternoon. All late hours and excitement should be avoided with young girls at school, and the greatest care should be exercised to prevent over-exertion. The requirements of our large schools are such as to tax the capacities of a growing girl to the utmost, and if she is to keep up to them she must have every external aid in the healthy regulations of her life out of school hours. A young girl suffering from dysmenorrhea should never be sent to school during the menstrual period; and in a good many cases she should be taken away altogether for some months, or a year, if necessary.

Fresh Air and Exercise.—A considerable amount of time spent in the open air is of vital importance. The conditions of a woman's life in this respect are greatly improved upon what they were a generation ago, and a variety of outdoor amusements are now open to her. Walking, riding, driving, bicycling, or some form of active game, such as tennis, golf, or basket ball, are very desirable; and some hours spent out of doors, in all but the most inclement weather, should form part of the routine of each day.

Rest.—More benefit is derived from rest in the treatment of dysmenorrhea than from any one other remedy. Absolute rest in bed during the periods is essential. Every patient suffering from established dysmenorrhea should remain in bed for two to three days at each menstruation, and whenever it is possible, the rest should begin before the appearance of the flow. Careful observance of this rule in conjunction with other remedies will, in many cases, completely relieve the dysmenorrhea, and the patient will be able after some months to resume ordinary habits during menstruation. In other cases it will be necessary to continue the practice of rest in bed for at least the first twenty-four hours each time, if the relief from suffering is to be permanent.

Regulation of the Bowels.—Dysmenorrhea is frequently associated with constipation, so frequently, indeed, that keeping the bowels open, and even a little relaxed at the time of the menstrual period, is often most effectual in giving relief. I have known one case in which perfect relief for several periods was obtained by taking a heaping teaspoonful of Husband's magnesia every morning for three or four days before menstruation. In young girls who suffer from dysmenorrhea, it will often be discovered on close questioning that there is no regular evacuation of the bowels, and that the patient is quite unaware of the importance of the habit to either her general health or her menstruation. In such cases it is well to focus attention upon this point until the constipation is overcome, and this will often result in entire relief of the menstrual suffering.

REMEDIES FOR RELIEF OF PAIN DURING MENSTRUATION.

Opium should rarely be given for the relief of dysmenorrhea, any more than for any other form of protracted suffering characterized by paroxysms, that does not tend to a fatal issue. The various forms of alcoholic stimulants so much in vogue are also contraindicated. There is a strong tendency among the poorer classes to seek relief in either gin or whiskey, and this point should be especially borne in mind among dispensary patients. The various patent medicines taken for the relief of pain all contain a large percentage of alcohol and their use should be systematically discouraged. The percentage of alcohol by volume in some of these compounds, as given by the Massachusets State Board Analyst, is as follows:

Lydia Pinkham's Vegetable Compound	20.6
Peruna	28.5
Paine's Celery Compound	21.0
Jackson's Golden Seal Tonic	19.6
Schenk's "Sea-weed Tonic," "entirely harmless"!	19.5
Ayer's Sarsaparilla	26.2
Hood's Sarsaparilla	18.8

It is necessary, however, or at any rate desirable, to combine a stimulant with the coal-tar preparations which are so much used for the relief of dysmenorrhea, in order to counteract the depressing effect upon the heart exercised by that class of remedies. Five grains of phenacetin with two teaspoonfuls of whiskey are sometimes given for the relief of menstrual pain, but it should always be given by the physician in the form of a prescription, and never put into the patient's hands as a remedy for general use, which she is at liberty to renew at her discretion. The evils of alcoholic stimulation are so great, however, that I prefer to give twenty to thirty drops of the aromatic spirits of ammonia in a little water.

The following formulæ for the relief of menstrual pain I have found useful in my practice:

℞ Phenac. } āā .... gr. ij
Salol }
M. Ft. charta. Mitte tales no. vi.
S. One powder every four hours.

℞ Potass. bromid. .... ʒij
Elixir guaran. and celer .... f℥ij
M. S. One dessertspoonful every four hours in hot water.

℞ Acetanil. (Phenac.) .... gr. v
Codein .... gr. ss
M. Ft. charta. Mitte tales no. iv.
S. One powder and repeat in an hour.

℞ Apiol. .... gr. 1
Ft. caps. no. xii.
S. One capsule each night and morning for two or three days before menstruation.

℞ Hydrastis canad.	f℥ij

S. Twenty-five drops in a wineglassful of water twice a day, beginning a week before menstruation and continuing through the flow.

Dr. Walter L. Burrage recommends the various *Helonias* compounds, which he has found useful. The best of them, in his opinion, are "Mistura Helonin Compound" and the fluid extract of "Helonias Compound." These preparations are safest, as they do not contain an opiate, and the quantity of alcohol per dose is infinitesimal. The compound mixture of helonin, known as "Green Mixture," because of its brilliant color, may be given in doses of a teaspoonful in half a teacupful of hot water every fifteen minutes during a paroxysm of pain, or three times a day during the intermenstrual period, or for a week before the flow is expected.

The two following prescriptions given by B. C. Hirst ("Diseases of Women," 2d edition, p. 421) seem likely to be valuable:

℞ Acetanil.	gr. ij
Ammoniæ carb.	gr. iij
Heroin	gr. $\frac{1}{24}$

M. Ft. pil. Mitte tales no. vi.
S. One pill every hour for three hours.

℞ Tinct. opii camph.	f℥j
Tinct. zingerb.	f℥j
Spts. chlorof.	ℨij
Syrup. acac.	f℥ss
Aq. menth. pip., q. s. ad	f℥iv

M. S. One tablespoonful when required for cramp.

In cases where the flow is scanty and the pain begins before its appearance, to be relieved by its establishment, I have found great benefit from the use of a rectal injection containing a heavy dose of sodium bromide in hot saline solution; it acts as a local sedative and also stimulates the flow by dilating the blood vessels. The formula for it is as follows:

℞ Sodii bromid.	gr. xl
Hot saline sol., $\frac{6}{10}$ of one per cent	Oj

M. S. Inject into rectum and retain.

Another rectal injection from which benefit is obtained is:

℞ Antipyrini	gr. xv
Sod. chlor.	gr. xxx
Aq.	f℥viij

M. S. Inject into rectum and retain.

The application of heat externally often gives much relief. Hot water bags are excellent, or hot sand bags. A hot mustard foot bath is sometimes of service. For the latter purpose I use two teaspoonfuls of mustard in a foot-tub full of water, as hot as can be borne.

In cases where the pain is of the congestive character, T. A. Emmet recommends a plan of treatment directed to the relief of venous engorgement ("Principles and Practice of Gynecology," 3d edition, 1884, p. 177). A foot bath as hot as can be borne should be given, followed by some kind of hot drink. A hot mustard plaster is then applied along the spine. This should be about three inches in width and reach from the cervical region of the spine to the sacrum. As a rapid action is desired, the unadulterated mustard must be rubbed up into a thick paste with warm water and then reduced to the proper consistency by adding an ounce or two of syrup or molasses, which will at once develop the volatile oil. A piece of unstarched muslin, sufficiently long and some nine inches in width, is laid out at full length and the mustard is spread down the middle for one-third of the width, so that when the strip is folded over, the mustard will be covered on one side by two thicknesses of the cloth. The surface which is covered by the single thickness of cloth must be warmed and kept folded together until applied. The skin will become reddened in from ten to twenty minutes and the plaster must not be allowed to remain longer, even though the patient should not complain of pain occasioned by it. When the flow is delayed, dry cups, in Emmet's opinion, are more efficacious than the mustard plaster in bringing it on. These must be put on each side of the spinous processes and only in the immediate neighborhood of any point which may be found tender on pressure. The relief is more prompt when four to six large tumblers are used than it is with the ordinary sized cupping glasses. Unless the tumblers are unusually thick and heavy, there is no difficulty in making them hold on, after properly exhausting the air, by igniting a little alcohol which has been poured directly into the glass or upon some cotton on a piece of paper stuck to the bottom. The damp cotton must be firmly pressed against the bottom of the glass before dropping on the alcohol, and any excess of alcohol which may have run down to the edge of the glass carefully wiped up in order to avoid burning the patient. Fifteen to twenty minutes is long enough for the cups to remain in one place, after which they may be shifted to another. It may be necessary to repeat this treatment month after month until the local disease underlying the dysmenorrhea has yielded to treatment. During the interval between the menstrual periods, the general health must be carefully watched according to the rules laid down. A Turkish bath is often beneficial when taken within a week before the expected period.

When the pain is intense and all other remedies have failed, morphin may be given hypodermically as a last resort. As a rule, a single dose of one-eighth or one-fourth of a grain will be sufficient. It should always be controlled by the physician, and if a marked neurotic element is present he must exercise extreme caution, especially if the dose has to be repeated several times. The patient must always be kept in ignorance of what she is taking.

REMEDIES FOR PERMANENT RELIEF OF DYSMENORRHEA.

Pessaries.—Dysmenorrhea associated with retrodisplacements of the uterus is sometimes relieved by an appropriate pessary. In one case under my care I found entire relief afforded by one of the Smith-Hodge variety. The selection of a suitable pessary and the best method of its application are discussed in Chapter XIII.

Electricity.—The treatment of dysmenorrhea by means of electricity was a subject of much interest some fifteen years ago, and promised to yield most excellent results, according to certain good authorities. The method has failed to fulfil its early promise, not because it has proved untrustworthy, but because there has been a general failure of interest in the question of the use of electricity in gynecology. It seems a matter for regret, however, that the electrical treatment of various gynecological affections should not receive more attention, and, therefore, I quote from some of the early papers on the subject in hopes that the various methods there described may be of use to the practitioner of to-day.

W. B. Sprague (*Ann. Gyn. and Ped.*, 1891, vol. 4, p. 402) says: "I have learned to take my battery with me whenever called to relieve a woman suffering at the menstrual period, if it be possible. For this purpose I generally use a Kidder five-post battery, and use the current from the extreme posts (the A-E current) with the shell of the magnet well drawn out. I thus secure a current of great tension, which is the best for relief of pain. Placing the positive electrode, usually a copper plate covered with some absorbent material which is well moistened, in the lumbo-sacral region, I use a small electrode covered with absorbent cotton over the hypogastrium with a kneading, rotary, and vibratory motion—a sort of electro-massage. This not only invariably relieves the pain greatly, but increases the flow materially, so that the only contra-indication is a tendency to menorrhagia. I have also used the static and galvanic currents to palliate the pain, with considerable, though somewhat less benefit—the former under similar conditions to those in which the faradic current is indicated, the latter in menorrhagia. . . . Only a moderate current is required in most cases—from five to twenty-five milliampères, but in cases of severe hemorrhage I have found it necessary to use from fifty to sixty milliampères. Strong currents, while necessary to check hemorrhage, generally increase the pain at first, but cessation usually follows, if it be gradually reduced and followed by the sacro-pubic administration for a few minutes following the removal of the internal electrode."

A. Lapthorn Smith (*Amer. Jour. Obst.*, 1891, vol. 26, p. 161) states that he has found the most important agent in the treatment of dysmenorrhea of uterine origin to be the application of the mild galvanic current to the inside of the uterus by means of the ordinary uterine sound, insulated to within two and a half inches of its end, to the handle of which was attached the negative pole of the battery. The treatment is usually less painful than the passage of the sound, as will appear from the following brief description of the method: "After a careful bimanual examination for the purpose of excluding pregnancy and ascertaining the position and condition of the pelvic organs, the vagina is disinfected by a douche, if this has not already been done at the patient's home. An ordinary Simpson's uterine sound of large size is then bent to the ascertained curve of the uterine canal, passed through the flame of the spirit lamp, cooled, and insulated with a clean piece of rubber tubing to within two and a half inches of its extremity, or less, if we have reason to think that the uterus is undeveloped. In the handle of the sound a hole has been bored, just large enough to hold the tip of the conducting cord from the negative pole or last zinc of the battery. The sound is then guided into the os uteri on the tip of the finger until it meets with some obstruction, when a current strength of ten milliampères is turned on. In a minute or two the obstruction will seem to melt away and the sound will glide into the cavity of the uterus. The current is now gradually raised until the patient says she can feel it in the uterus, generally between twenty and fifty milliampères, being at once lowered on the slightest complaint of pain. At the end of five minutes the current is gradually turned off again, when the sound will be found to drop out almost of its own accord, and very much more easily than it entered. This may complete the séance, or, as an adjuvant and safeguard a boroglycerid tampon may be inserted. The patient may return home on foot and resume her duties forthwith, as such mild applications do not require any precautions in the way of resting, etc. The positive pole of the battery is attached to the ordinary clay abdominal electrode." The following case is cited by Dr. Smith as an instance of the success of the above mode of treatment:

"Miss W. was sent to me on the third of June, 1888, by Dr. Reddy with a uterine fibroid and an enormous hypertrophy of the cervix. Her sufferings every month were unendurable. She had been employed as cook in a private family, but had to give up her situation, as during menstruation she was totally incapacitated. She described the pain as agonizing, her screams being heard all over the house. I gave her two applications a week from then till July 28th of the same year, less than two months, when she reported that she had had a period absolutely free from pain. I continued to treat her for another month, but she has never had a painful period since, and was still menstruating regularly up to a few months ago when I saw her last, in perfect health, and doing all the catering and cooking for a large boarding house."

A more recent paper than these is one by A. H. Goelet (*Internat. Jour. Surg.*, March, 1900). In this he speaks most highly of electricity in the treatment of dysmenorrhea associated with stenosis, obstruction, or flexion. In cases of flexion it may be necessary to use tampons in conjunction, to support the uterus at a higher place in the pelvis until its weight is diminished and it is no longer dragged down.

For the purpose of overcoming obstruction in the canal, whether associated with flexions or not, moderate electrolysis is employed. This produces distinct widening of the canal which promotes drainage of increased secretion, pent up in the cavity as the result of obstruction. The strength of the current (galvanic) employed for the purpose should not exceed ten milliampères, and the duration of the application should be three or four minutes. Thus cauterization is avoided as obviously objectionable, since it would eventually lead to permanent stenosis from cicatricial contractions. The frequency of the applications may be every second day for the first week or two, according to the condition; twice a week during the third; and cessation during the menstrual period. If complete relief is obtained at this stage, one application may be made two or three days immediately preceding the next two succeeding periods. The electrode is inserted with a speculum in the vagina or along the index finger as a guide. Strict antisepsis must be preserved throughout. The instruments and hands must be clean and the vulva and vagina thoroughly irrigated with an antiseptic solution immediately before treatment. Following each application the pelvis is submitted to faradization with the current from the long fine wire coil by means of the bipolar electrode in the vagina for the purpose of overcoming the pelvic hyperemia which constantly accompanies this form of dysmenorrhea. These applications should be continued for ten to fifteen minutes.

Goelet considers that dysmenorrhea due to ovaritis and salpingitis, without suppuration, is amenable to this mode of treatment, if the details are carried out with care. In these cases, particularly where there is much sensitiveness to digital pressure in the vagina, the treatment should begin with faradization (bipolar) through the vagina with the most sedative current obtainable, and these applications, which are repeated every twenty-four hours, should be continued each day for fifteen minutes, maintaining the current constantly throughout the application at a point where it is barely appreciable to the patient. The strength of stimulation of the current should be increased only with the decrease of sensitiveness. When this has been accomplished, negative electrolysis of the canal is employed, when necessary, to promote drainage from the uterine cavity and tubes. In the beginning it is best to start with an application of only five milliampères and continue it only two minutes. The application is repeated in two or three days, if no reaction follows to show that it is contra-indicated. The applications to the canal should be discontinued as soon as the necessity for drainage is no longer indicated, but the faradic applications are to be continued every second or third day until the cure is complete.

Dysmenorrhea due to anemia and impaired nutrition will yield to vigorous applications of static electricity, consisting of sparks over the spine and especially over the sacrum; sparks to the hypogastric region, repeated daily, or every second day; and the application of a stimulating static breeze applied generally. The applications are discontinued during menstruation. From two to three months are usually required to effect a cure.

Dysmenorrhea due to imperfect development of the uterus and ovaries can only be benefited by electricity, if treatment is instituted before the patient has attained maturity. The applications must be made directly to the uterus with the object of stimulating this organ, and through it, the ovaries. An electrode with two and a quarter inches of exposed surface is inserted into the uterus and connected with the negative pole of the faradic apparatus. The other pole terminating in a felt electrode the size of the hand, is placed over the lumbar region and the current is employed as strong as it can comfortably be borne. It should be maintained for five or ten minutes and its strength constantly increased throughout the application, so as to maintain a stimulation throughout, the object being to excite an increased blood flow to the uterus. The applications should be repeated every second day at first, and later every third day. Applications of static electricity at the same time will aid materially by stimulating an increased general nutrition. The method which is particularly effective is the static breeze: sparks to the spine, over the sacrum, and to the hypogastrium, with the breeze to the head for five to ten minutes after the other application. The static spark exercises a decided revulsive effect which relieves internal congestion, stimulates the general circulation, and, together with the breeze, promotes nutrition. The breeze to the head quiets nervous irritation and induces natural sleep.

It will be seen that the various advocates for the use of electricity in gynecology differ in regard to the details of its use, and no doubt every practitioner who makes use of it will find it expedient to develop his own method. It is to be hoped that gynecologists, and general practitioners who practice more or less gynecology, will give the use of electricity in the treatment of dysmenorrhea a thorough trial during the next few years, for it would seem to offer a fair prospect of relief in certain intractable cases, although it is still upon probation.

Operative Treatment.—Permanent relief from dysmenorrhea, if other remedial measures fail, must be obtained from operative treatment. In cases where the suffering is caused by lesions of the pelvic organs, the cure of these lesions will generally be followed by the disappearance of menstrual pain, but the treatment of such cases belongs to the specialist. For the relief of dysmenorrhea not associated with organic lesions, however, there is one form of operative treatment so simple as to be within the scope of the general practitioner, and therefore within the limits of this work, namely, dilatation of the cervix uteri, followed, when it is indicated, by curettage of the endometrium. In cases where the organs are apparently normal this mode of treatment has yielded the following percentage of good results in my clinic. Out of ninety-five cases, eighteen were entirely relieved with no subsequent return of the pain, and fourteen were greatly benefited, the pain never returning to its former severity. The periods of observation in these cases extended over from one to twelve years. Of the remaining cases, seven were relieved completely or in great part for periods of from one to twelve years, after which the dysmenorrhea returned. In thirty-nine instances, therefore, out of ninety-five, the results might be considered satisfactory. In twenty-one cases there was no relief at all, while the remaining thirty-five cases experienced more or less relief for a few months, but within a year the pain returned in the same severity as before. When the dysmenorrhea returns after a few years or months of comfort we are justified in recommending a second operation.

There is no symptom complex by which the cases where dilatation may be expected to do good can be differentiated with certainty from those in which it will not. In general, however, we may anticipate relief in cases where the pain begins a few hours before the flow, is sharp in character, and lasts but a short time. A marked neurasthenia does not necessarily forbid a good result, but if permanency of relief is to be secured, the neurasthenia must also be cured. An excellent plan in such cases is to institute a thorough rest cure by an ether examination and a dilatation, with curettage, if necessary.

DILATATION.

This operation does not yet stand upon a scientific basis, for its mode of action is not clear and its results are far from uniform. It must always be borne in mind that not every case of dysmenorrhea is suitable for dilatation. The general practitioner, and even many a specialist, often make the mistake of beginning the treatment of every case of dysmenorrhea by dilatation, without a proper preliminary search for the cause of pain, forgetting that in certain cases the pain is due to the presence of definite lesions, such as ovarian disease, pelvic peritonitis, or small interstitial fibroids, which are not of a nature to be relieved by such treatment. In order to make clear the relation of dysmenorrhea to a variety of pelvic affections which are apt to escape detection upon a superficial examination, I analyzed two hundred and fifty-five cases, taken consecutively, of pelvic peritonitis with adherent tubes and ovaries, tubercular peritonitis, hydrosalpinx, and catarrhal salpingitis, and found that out of the two hundred and fifty-five cases, one hundred and eighty suffered from dysmenorrhea, while it was absent in only seventy-five cases.

If the physician has determined by a careful examination that no lesions of the kind described are present, and if the various remedial measures have been tried without success, dilatation should always be performed, and followed by curettage, if the latter seems advisable.

Choice of Method.—Slow dilatation by means of laminaria or tupelo tents, much used in Germany, has been generally abandoned in this country, for fear of septic infection. The class of uteri which need dilatation and curettage are often already infected, and the introduction of a hard foreign body in the form of a tent, which bruises and lacerates the tissues while it is being introduced and keeps up a constantly increasing pressure, affords just the condition most favorable to the entrance of pathologic organisms into the system. In many instances the patient recovers from the operation with a chronic pelvic inflammation, and not a few deaths have been due to sepsis originating in this manner. A fatal case of infection following slow dilatation has been reported by Dr. T. S. Cullen (*Johns Hopkins Hosp. Rep.*, 1897, vol. 6, p. 109). The patient was a young woman whose physician had thought it necessary to induce an abortion in the fourth month of pregnancy, and therefore he inserted a slippery elm tent into the uterine cavity. A few hours afterwards the patient suddenly became deathly pale and fainted away. On recovering she complained of great pain in the abdomen and had a slight uterine hemorrhage. Four days later she had a profuse hemorrhage, but it was not possible to ascertain whether the fetus had been expelled. On the fifth day she had a severe chill, followed by high temperature, marked abdominal distention, and extreme tenderness over the abdomen. The chills continued at irregular intervals until the sixteenth day, when symptoms of peritonitis appeared and death took place at the end of twelve hours. At the autopsy the peritoneum was found to contain several quarts of purulent fluid and the uterus was enlarged and softened. It was removed, and when the alcoholic specimen was examined it proved to measure 13 × 9 × 6 cm., while its cavity was 9 cm. in length. The latter contained six pieces of wood (the component parts of the elm tent), which, when united, formed a perfect cone with a hole perforating its base. The uterine walls were extensively necrotic and cocci were found everywhere in the uterine blood vessels, as well as in the thin sheet of fibrin which covered the uterus itself. This case is an excellent illustration of the fact that the tent ought only to be used in clean cases, that is to say, where there is no suspicion of any cervical or intra-uterine infection. I would not use it in a septic abortion or a sloughing fibroid.

Gradual dilatation by means of Hegar's graduated dilators has been successful in some cases. According to this method dilatation should be begun by dilators, measuring 3 to 5 mm. in diameter, the size being increased day by day during the interval between menstrual periods until 8 to 10 mm. is reached.

Rapid dilatation is, however, the method now most generally employed and it is certainly the safest.

Preliminaries to Operation.—The bowels must be carefully emptied by means of either a teaspoonful of liquorice powder the night before the operation, or an equal amount of magnesium sulphate on the morning of it. If it seems necessary, this may be followed by an enema of warm soap and water. The operating table is covered by a sterilized sheet and a rubber pad is laid over one end of it. The patient, after being anesthetized, is placed upon this in the lithotomy position. The vagina is now cleansed with soap and water on pledgets of cotton introduced by means of a long forceps. After this, it is irrigated with a solution of bichloride of mercury, 1:1,000. The best anesthetic is nitrous oxide gas, and if this does not give sufficient relaxation, a few whiffs of ether may be administered and the gas resumed. The whole operation should not take over five minutes. A careful bimanual examination of the pelvic organs should always be made while the patient is under the anesthetic. Not only does it afford valuable information as to her condition, but if the direction of the uterine canal is known, it greatly aids the introduction of the dilators. The instruments used are shown in Figure 52.

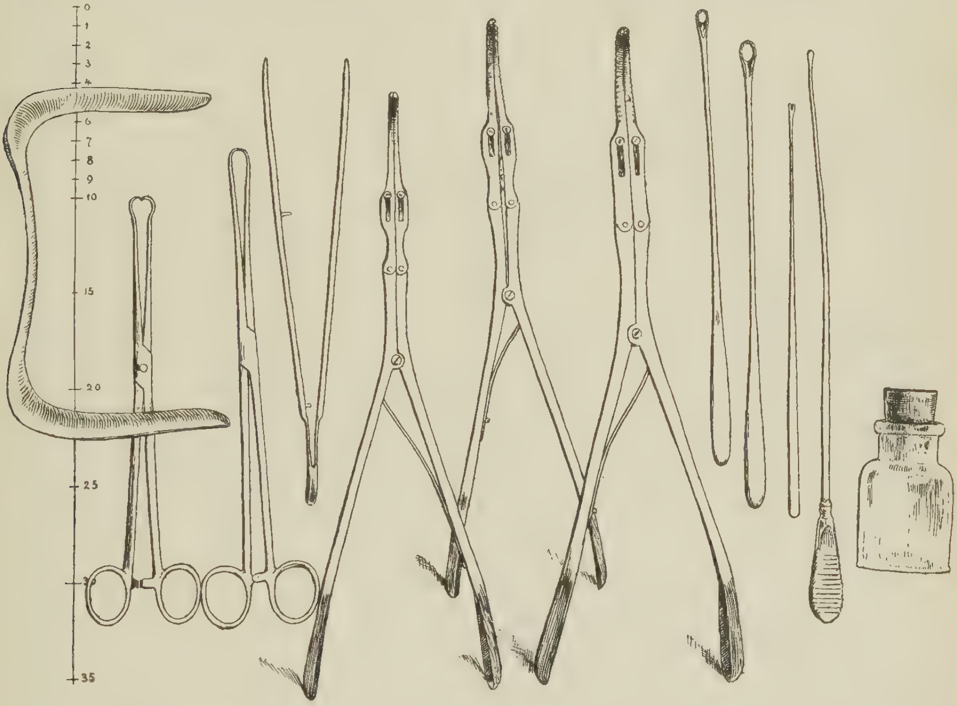

FIG. 52.—INSTRUMENTS USED IN DILATATION AND CURETTAGE OF THE UTERUS. These instruments are in order from left to right, Sims' speculum; two traction forceps; dressing forceps; three uterine dilators; two serrated curettes; one gauze packer; one uterine sound; bottle of formalin solution for specimen secured.

Operation of Rapid Dilatation.—In the virgin the well-anointed index finger must be introduced into the vagina slowly and gently, to avoid injuring the hymen. When the finger touches the cervix, a pair of tenaculum forceps is introduced and the cervix firmly grasped by its anterior lip. The finger is then withdrawn, and traction made with the forceps until the os uteri is seen at the vaginal outlet (see Fig. 53). When the orifice is small, or the examining finger large, the position of the cervix must be determined without vaginal examination by a careful rectal palpation, in order to avoid injuring the hymen, after which the tenaculum forceps are introduced into the vagina, and under the guidance of the rectal finger the anterior lip of the cervix is cautiously drawn down to the outlet. In married women, and in those who have borne children, the posterior vaginal wall may be readily retracted by a Sims' or a Simon speculum or even with two fingers, so as to expose the cervix, which is then grasped by the tenaculum forceps and drawn down.

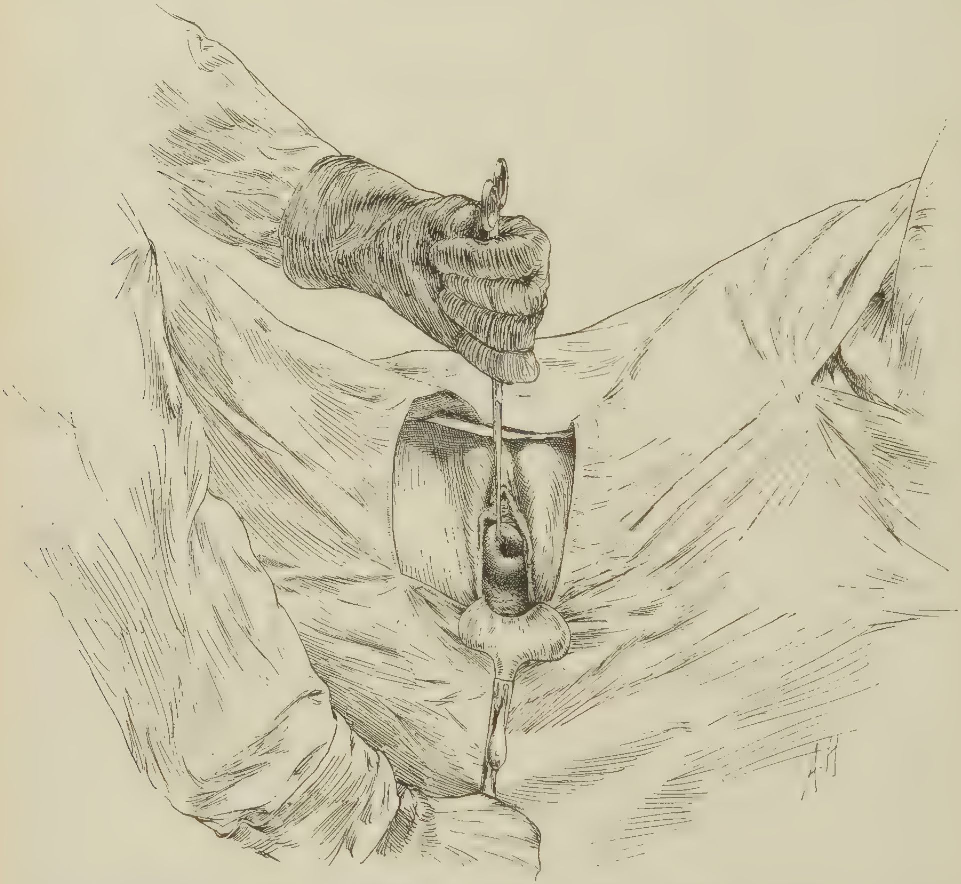

FIG. 53.—THE CERVIX CAUGHT AND EXPOSED BY RETRACTING THE POSTERIOR VAGINAL WALL WITH A SPECULUM, GRASPING THE ANTERIOR LIP WITH A BULLET FORCEPS, AND DRAWING IT DOWN TO THE VAGINAL OUTLET.

Dilators of the Goodell-Ellinger pattern of three sizes are needed (see Fig. 52). The smallest of these, which has smooth blades, is 4 mm. in diameter, while the two larger, which are 5 and 6 mm. in diameter, respectively, are both corrugated, as recommended by the late Dr. William Goodell. My own dilators have a spring between the handles, but are not provided with either ratchet or screw. The handles are bent at an angle and are made large enough to be grasped in the full hand; the dilating end is blunt and slightly curved. Light instruments with a strong curve and a tapering point are dangerous and must not be used.

The smallest dilator is now taken up, poised delicately between the fingers like a pen, and gently introduced within the external os, after which it is pushed up the canal to the internal os (see Fig. 54). The dilator must never be grasped with the handles braced against the palm of the hand and forced through obstructions. When resistance is encountered, as it commonly is, in passing from the internal os into the uterine cavity, the dilator must be withdrawn a little until by repeated efforts and without force, it finally passes the obstruction and slips in. The danger of forcing a sharp dilator into the uterine canal without due precaution is considerable. I have seen a death resulting from neglect of the precaution (*Amer. Jour. Obst.*, 1891, vol. 24, p. 42). The surgeon pierced the posterior wall of an anteflexed uterus at its cervical junction and bored a hole into the peritoneum. He then inserted a coarse sponge tent into the cervix, which projected partly within the peritoneal cavity. The patient died in a few days of peritonitis, in spite of an effort which I made to save her by opening and draining the abdomen. The risk of perforating an anteflexed uterus is so manifest that I cannot avoid the conviction that such an accident has happened more frequently than is generally known.

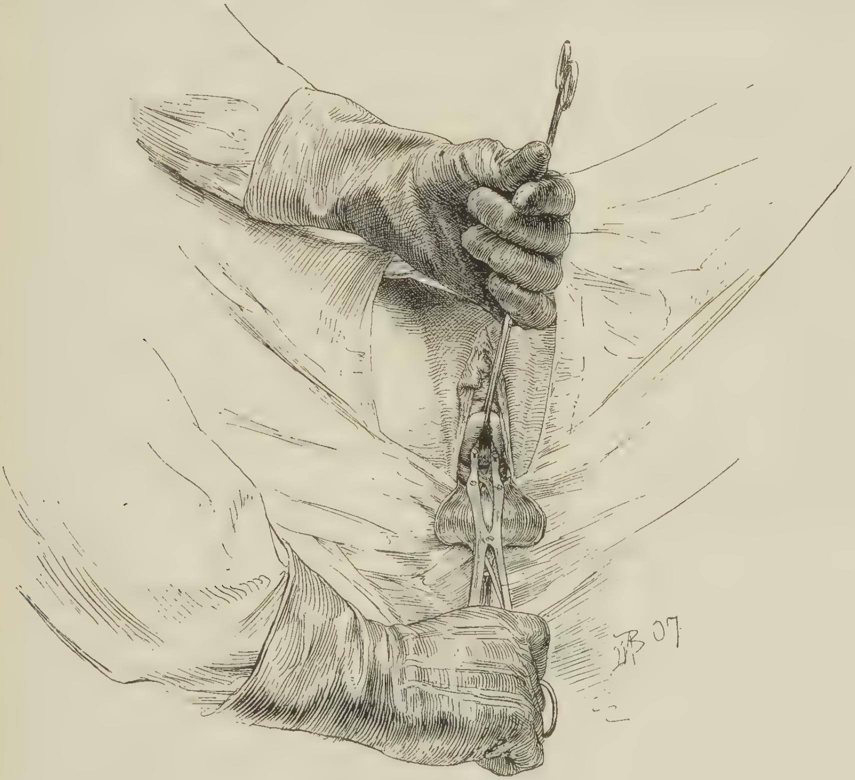

FIG. 54.—DILATATION OF THE CERVIX WITH THE GOODELL-ELLENGER DILATOR.

The blades of the dilator being well introduced, the canal is first dilated in one direction; the pressure is then relaxed and, when the blades have closed, the dilator is rotated a little, so as to dilate another portion of the canal, this process being continued all around the circle back to the first point. The cervix yields to these repeated gentle impacts from within on all sides and is gradually and equably dilated to the necessary extent without laceration. In this way the canal is opened up within a minute or two, sufficiently to admit a large corrugated dilator with which the dilatation is continued in like manner from side to side, antero-posteriorly and at all points between.

This extent of dilatation, which is large enough to admit the introduction of a bougie 1 cm. in diameter, is usually sufficient for the relief of dysmenorrhea; a somewhat greater dilatation may be obtained by using the largest size dilator, but not without risk of great injury to the cervix. It is never justifiable to attempt the dilatation of the cervical canal sufficiently to permit the introduction of the index finger into the uterine cavity, for it can be accomplished only by extensive rupture of the cervix.

The method just described, in which the cervical canal is dilated through successive impacts on it from all directions, is far better than the common method of opening a dilator controlled by a ratchet or screw and expending all the force in one direction until the fibres split and a tear is produced. The damage done the cervix, the greater danger of septic infection, and the possibility of cancer developing in the scar which remains after the rent heals, are great objections to forcible dilatation in one direction.

In many cases it is advisable to follow up the dilatation by curettage, and the method for doing this will be found in Chapter VII.

After dilatation the patient should be kept in bed for from one to fourteen days, according to conditions. If her general health is good and her nervous system undisturbed, twenty-four hours will be sufficient; but if she is anemic and reduced by continued suffering, advantage should be taken of the opportunity afforded by the operation to give her as long a rest as possible, with the advantage of care, attention to diet, and other essentials to complete recovery. A neurasthenic patient should always be kept in bed after the operation for ten days to a fortnight.

Dilatation, as I said, is the only form of operative treatment for dysmenorrhea which comes within the scope of this work. Removal of the ovaries in intractable cases, however, sometimes comes before the general practitioner, because his advice is sought as to its advisability by the patient or her relatives. I cannot leave the subject without speaking emphatically against such a practice. The removal of diseased ovaries is an entirely different matter; the removal of healthy ovaries for the relief of dysmenorrhea is almost never justifiable. The only occasions in which it can ever be so, are the rare instances in which long continuance of pelvic pain is wrecking the patient's health and disabling her to such an extent that she is incapacitated for self support or for the performance of imperative household duties. In an extensive gynecological practice I do not think I average one case a year of this kind. The patient's word or that of her relatives must never be taken as a gauge of the amount of suffering experienced, for, with every intention to be honest and avoid exaggeration, it is almost impossible for them to be accurate. If such a measure is in contemplation, the physician must convince himself of the intensity of the pain by his own observation of the patient through several periods. The effect upon her general health is also a reliable test. So long as the suffering is confined to the menstrual periods, and the interval is free from pain, the patient's health rarely suffers to any great degree; if, however, as sometimes happens, she is never wholly exempt from pain, some degree of neurasthenia is almost certain to ensue, with loss of appetite, sleep, and general impairment of physical condition. Under such circumstances as these the patient loses weight and strength, her face acquires a haggard, anxious expression, and there is every indication to the practiced eye that her general health is much impaired.

Another point upon which I should like to lay stress in this connection is that the fact of ovaries being cystic is no reason, *per se*, for their removal. It is not definitely decided whether any clinical symptoms arise from the cystic follicles from the size of a pea to that of a cherry, which are often observed. One thing is quite certain, however, namely, that small cystic follicles never of themselves justify the removal of an ovary, or a piece of an ovary. The removal of one ovary is sometimes suggested for the reason that it is " down," but this expression is just about as scientific as saying that the palate is " down and needs cutting."

How great may be the influence for good of the conscientious general practitioner in cases of this kind is shown by the following case which recently passed through my hands:

A young woman of two or three and twenty was brought to me with the following history: About two years before she had begun to suffer from dysmenorrhea after a fall from her horse. She lived in the country, on a farm, where no medical attendance was within reach except that of the general practitioner in the neighborhood. He attended her for some time without success, and then, finding that she was, if anything, worse and that her limited means prevented her coming to the city to consult a gynecologist, he suggested asking the advice of a well-known general surgeon who passed his summer holidays in the neighborhood. The surgeon made a pelvic examination and advised the removal of one ovary, on the ground that it was cystic. This he did and for a short time the patient improved, but within six months she was suffering as much as ever. The same surgeon was again consulted and insisted that the only possible remedy was the removal of the other ovary. The patient and her family consented, with reluctance, but fortunately for the issue, the country physician, who still had the case in charge, set before them earnestly that the removal of both ovaries in a girl not much over twenty, who was, moreover, engaged to be married, was too serious a step to contemplate without the opinion of a competent gynecologist as to its necessity, and that it was their duty to make an effort to obtain this, no matter what exertion or sacrifice it involved. Accordingly, the patient was brought to me, and I made an examination under ether, at which I found nothing whatever the matter. I dilated and curetted, however, thinking the case one where it was likely to be beneficial, and the patient has ever since (nearly five years) been free from anything more than a trifling amount of pain. Yet her whole future would have been sacrificed had it not been for the influence of her physician.

MEMBRANOUS DYSMENORRHEA.*

There is one kind of painful menstruation so peculiar as to demand special consideration. This is the form known as "membranous dysmenorrhea," characterized by severe cramp-like pains, resembling those of labor, followed by the expulsion of the lining membrane of the uterus, either whole or in part. The cases vary in severity from the typical form in which a complete cast of the uterine cavity is discharged at each period with great suffering, to a mild type where only small fragments of the endometrium are discharged at intervals of several months, with a trivial amount of pain. When the membrane is passed entire, which, however, rarely happens, its nature can be readily recognized by floating it in water; a shaggy outer coat can then be distinguished, of narrow triangular form, with little openings at the base corresponding to the tubal orifices and a larger opening corresponding to the internal os. The affection is not a disease *sui generis*, but a condition which develops under varying conditions, complicates different pathological processes, and presents a variety of microscopic appearances. Some writers have, therefore, suggested that the term "membranous dysmenorrhea" should be abandoned in favor of "exfoliative endometritis" (Wyder, *Arch. f. Gyn.*, 1878, vol. 13, p. 39) or "exfoliation of the menstrual mucosa" (Löhlein, *Zeitschr. f. Geb. u. Gyn.*, 1886, vol. 12, p. 465).

History.—The condition was first recognized by Morgagni ("De Sedibus et Causis Morborum," 1779, Bk. III, Letter 48), who reported a case and gave an excellent description of its clinical course. The first microscopic study of the membrane was made by Ernst Heinrich Weber, and the term "membranous dysmenorrhea" was given in 1846 by Oldham (*London Med. Gaz.*, 1846) and Simpson (*Edin. Med. Jour.*, 1877). The resemblance to decidual tissue excited a prolonged discussion in Germany as to whether all cases of membranous dysmenorrhea were not really early abortions, and it is only within the last thirty years that the two conditions have been clearly differentiated. The first adequate histological study in modern literature is that by Wyder (*loc. cit.*). Von Franqué, in 1893, made an elaborate study of the pathological anatomy (*Zeitschr. f. Geb. u. Gyn.*, 1893, vol. 27, p. 1), and since then numerous isolated cases have been reported, but little new information has been added to the subject.

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*A paper by Dr. Elizabeth Morse (*Johns Hopkins Hospital Bulletin*, 1907, vol. 18, p. 40), which is based upon an investigation of four cases of membranous dysmenorrhea in my clinic, is the foundation of this section.

Etiology.—The etiology and pathogenesis of the condition are obscure, partly, no doubt, because the affection is really rare and specimens for study are not often available. The most important etiological factor is a preceding endometritis, arising after childbirth, abortion, or a gonorrheal infection. In some cases there is a retroflexion of the uterus or some abnormality of the appendages. A considerable number of cases, however, occur in young unmarried women, where there is no history of infection and the pelvic organs on examination are apparently normal. In these cases there is, of course, the possibility of an overlooked vaginitis in childhood or an endometritis accompanying one of the exanthemata.

Clinical History.—In the first class of cases, where there is a history of infection, menstruation is usually regular and normal until a labor or an abortion takes place, followed by fever; or, it may be, there is an attack of gonorrheal endometritis. After the occurrence of some such cause, dysmenorrhea appears and is accompanied, in the course of a few months, by extrusion of the menstrual membrane. In the second class of cases, where the pelvic organs are normal, the menstrual history shows no irregularities and the dysmenorrhea, followed by the expulsion of the membrane, appears without any perceptible exciting cause whatever. In both classes the pain is intermittent and cramp-like in character, closely resembling labor pains, and the membrane is usually passed on the second or third day of menstruation. After the membrane is discharged, the pains cease and there is often a copious flow.

Macroscopic Appearance.—The menstrual membrane, when it is discharged, forms a triangular sac, having the shape of the uterine cavity; sometimes it has rounded holes at the sides of the tubal openings. The outer surface is ragged; the inner smooth. The thickness of the membrane varies from that of tissue paper to two or three millimetres. A membrane of greater thickness suggests decidua. Complete casts of the uterine cavity are more rarely found in membranous dysmenorrhea than in pregnancy. In the majority of cases the membrane is passed in fragments.

Microscopic Appearance.—From a microscopic point of view, the membranes discharged from the uterus may be divided into two classes, namely, exfoliated mucosa and fibrinous casts. In the first class of cases, exfoliated mucosa, there are two different types. One of these is that of interstitial endometritis, in which the stroma cells are of normal size and appearance and there is an infiltration of leucocytes. Hemorrhage, exudate, and fibrin are usually present in addition. In the other type the stroma cells bear a strong resemblance to decidua. They are enlarged, oval or polygonal in form, and have large vascular nuclei with abundant protoplasm; all gradations may be traced between them and the normal stroma. In some cases the entire membrane is composed of these altered cells, while in others, glands exist; occasionally two layers, one compact and one spongy, can be distinguished. It often happens that the two types are found in the same membrane. The large stroma cells are usually supposed to be the result of hyperemia and irritation. They are not peculiar to this condition, but are found also in glandular hypertrophy and edema of the endometrium, where they are accounted for by circulatory changes.

In the second class of cases, the fibrinous casts are composed of a network of fibrin, containing in its meshes red corpuscles, leucocytes, and remnants of the cells of the mucosa. There is some difference of opinion as to whether this second group of cases should be considered as true cases of membranous dysmenorrhea. They develop, however, in connection with endometric processes and are passed with the same symptoms as organized membranes; in fact, cases have been reported where a patient passed a fibrinous cast at one time and a membrane of altered mucosa at another. Moreover, it is impossible to separate the two varieties anatomically, on account of the many transitional forms between the simple fibrinous casts and the well preserved endometrium.

Mechanism of Separation.—The mechanism of separation of the membrane is obscure. The theory most generally accepted is that the hyperplasia of the stroma cells causes an obstruction to the escape of blood into the superficial layers, and therefore it spreads out into the deeper portions of the uterus, which yields at the weakest point on account of the friability due to chronic hyperemia and the youth of the connective tissue cells. The membrane is, so to speak, dissected free by hemorrhage. The free bleeding which so frequently follows the expulsion of the cast is in favor of this view; while, on the other hand, the fact that blood is often found distributed through all parts of the membrane is supposed to be against it. The degenerative changes which are taking place in the membrane must also be an important factor in causing separation.

Diagnosis.—The clinical history of membranous dysmenorrhea is, of course, extremely suggestive of the diagnosis, nevertheless, it can never be positively made without a microscopic examination, for there are two other kinds of casts discharged from the vagina which may simulate the menstrual membrane to the naked eye. These are vaginal casts and decidual casts. Vaginal casts are thrown off, either as the result of an exfoliative vaginitis or of treatment of the vagina with strong chemicals, such as silver nitrate. In the case of exfoliative vaginitis the tissue may be passed during menstruation or independently of it, but if the discharge occurs with menstruation and is accompanied by suffering of a cramp-like character, the case may readily be mistaken for one of membranous dysmenorrhea. How easily a mistake may be made in the absence of a microscopic examination is shown by the fact that out of eleven specimens sent to my laboratory at the Johns Hopkins Hospital with the diagnosis of "membranous dysmenorrhea," only four proved to be genuine. The others showed decidua in three instances and vaginal epithelium in two; while of the remaining two specimens, one was uterine polyp and the other blood clot. It must always be remembered that an exfoliative vaginitis may accompany membranous dysmenorrhea, and Leopold, who reports a case of this kind (*Arch. f. Gyn.*, 1876, vol. 10, p. 293), considers the cause of the two processes the same, namely, a superficial hemorrhage arising from extreme hyperemia and extending through the cervix into the vagina. Hoggan (*Arch. f. Gyn.*, 1876, vol. 10, p. 301) describes a case in which the upper part of the membrane was composed of uterine mucosa and the lower of vaginal epithelium. As a rule, vaginal casts and pieces of vaginal tissue are thinner, rougher, and more like parchment than membranes from the uterus, and no glandular openings are seen upon the surface. In differentiating from decidual casts the history must first be considered, since this form of cast is larger and more vascular than those of the dysmenorrheic membrane, and if chorion-like villi be found on microscopic examination, the diagnosis of extra-uterine pregnancy is, of course, clear. If decidua alone are present, it is a case of normal pregnancy. In an interesting case of my own the patient brought me two casts, one of which had been passed with menstruation, while the other, which appeared after the interval of a month, was an extra-uterine pregnancy. The greatest difficulty arises in cases where it is necessary to make a differential diagnosis between an early abortion and a menstrual membrane containing the decidua-like cells. This question occurs usually in cases of early abortion, before the decidua has reached its full development and typical form. The diagnosis must rest upon the fact that the cells in the menstrual membrane do not show the enlarged epithelioid appearance so often found in the mature decidual cell, and also that they have a more abundant protoplasm with more sharply defined outlines. Moreover, the protoplasm of the decidual cell loses its fibrillated appearance and takes a deeper eosin stain. The diagnosis can usually be made upon the microscopic evidence alone, but cases sometimes occur in which the final decision must include the clinical history.

Treatment.—The treatment in membranous dysmenorrhea is discouraging, and the prognosis as to recovery, either with or without it, is not good. When the underlying condition is obscure, the treatment most often adopted is curettage a few days before menstruation, followed by the classical application of iodine or carbolic acid and glycerin to the uterine cavity. This procedure may give temporary relief, but the patient generally relapses within a few months. Any associated lesions or abnormalities of the uterus or appendages should, of course, receive appropriate treatment. Sterility is the rule in membranous dysmenorrhea, although a few patients recover and become pregnant.

CHAPTER V.

INTERMENSTRUAL PAIN.

Definition, p. 118. History, p. 118. Age, p. 119. Relation to sterility, p. 119. Relation to childbearing, p. 119. Date of pain, p. 120. Character of pain, p. 121. Duration of pain, p. 121. Period of time during which pain lasts, p. 121. Presence and nature of discharge, p. 121. Relation to menstruation, p. 121. Location of pain, p. 121. Relation to lesions found on examination, p. 121. Methods of treatment and their results, p. 122. Illustrative cases, p. 123. Conclusions, p. 124.

Definition.—Intermenstrual pain is the name given to a form of suffering characterized by pelvic pain occurring on a fixed date between two menstrual periods, in some cases midway between, and in others on a definite date after the preceding period or before the following one. The Germans give the name "Mittelschmerz" to this affection, but this does not seem an accurate designation, since the pain does not always occur in the middle of the intermenstrual periods. Nor does the term "intermediate dysmenorrhea" appear more appropriate, for the special characteristic of the pain is that it occurs in the interval between the menstrual periods and is, therefore, distinct from dysmenorrhea. The term used by the French, "douleurs intermenstruelles," or its English equivalent, "intermenstrual pain," seems the most exact, as well as the most descriptive name for this affection.

History.—The disorder was first described, so far as I know, by Sir William Priestley in 1872. He then reported four cases, selected, he says, from a number of others (*Brit. Med. Jour.*, 1872, vol. 2, p. 431). Priestley says frankly that, at the time at which he wrote, any opinion as to the nature and causation of the affection was purely conjectural, and the years that have elapsed have contributed little to our knowledge on the subject. Priestley's theory regarding it is based on the fact that shortly before menstruation one or both ovaries become turgescent, an event known to take place, and this turgescence lasts through the menstrual period, continues for a few days after its cessation, and then gradually subsides. In Priestley's opinion it is not unreasonable to suppose that the preparation for an approaching period should take place as much as ten to fourteen days before its occurrence. Under normal conditions this preparation is not accompanied by any appreciable signs; but the presence of abnormal conditions in the ovary, or even of undue excitability where no structural change is apparent, may cause the preparatory stage to be as difficult and painful as the later stages, which are accompanied, in many cases, by painful menstruation.

Since the appearance of Priestley's article cases of intermenstrual pain have been reported from time to time, sometimes accompanied with suggestions as to its etiology. In looking over the literature of the subject I have been surprised to find that although the total number of cases definitely reported is small, most of the formal reports are followed by the mention of other cases occurring in the practice of those present; so that it would seem the affection is by no means so uncommon as it is usually believed to be, and it is possible that if all the cases coming under observation were carefully recorded, some definite conclusions might be reached as to its nature and etiology. I have collected all the cases which I could find in the literature, and after adding fourteen from my own case-books, I have made a careful analysis of the whole number, sixty-four. Space does not permit me to give any detailed account of so large a number here; I must confine myself to a brief statement of the main points brought out by the analysis, adding a few illustrative cases from my own records.

Age.—The age at which intermenstrual pain began was noted in forty-one out of the sixty-four cases. In only three did it begin with first menstruation; in all the others menstruation had been established for some years before it appeared. In ten cases (including the three beginning with first menstruation) the patient was under twenty when the pain began; twenty-nine of the remaining cases were between twenty and thirty-five; while two were over thirty-five. It seems reasonable, therefore, to conclude that intermenstrual pain is an affection belonging to the period of full sexual activity. Besides these forty-one cases, there were twenty-three in which the age of the patient when intermenstrual pain began was not stated, and could not be calculated from the other data. In seven out of the twenty-three, however, the age of the patient when she came under observation was given, six of them being between twenty and thirty-five, while one was forty-eight.

Sterility.—Out of the sixty-four cases, thirty-two had never had children or miscarriages (eleven of them being married and twenty-one single). Thirteen had had neither children nor miscarriages for as much as five years, and in most cases much longer. Fourteen had had children, or miscarriages, or both, within five years; and the condition of five as regards child-bearing was not stated. Or, to put the matter in another form, thirty-two cases were sterile; thirteen relatively sterile; fourteen fertile; and five unknown. These results seem to support the statement made by some persons that intermenstrual pain is associated, in the majority of cases, with sterility.

Relation between Intermenstrual Pain and Child-bearing.—Of the fourteen cases in which the patient had had either children or miscarriages, there were five in which the pain began after the birth of the last child, and three in which it began after a miscarriage. In six cases it was not stated whether the pain began before or after pregnancy. It would seem, therefore, that it is at any rate possible that child-bearing is, in some cases, an exciting cause. In three cases of intermenstrual pain, where pregnancy occurred, the suffering ceased entirely during the pregnancy and during lactation, returning on the reëstablishment of menstruation.

Date of Pain.—The data on this point are not so full as could be wished; in some cases the statement is made that the intermenstrual pain occurred a certain number of days after menstruation, leaving it uncertain whether this means after the beginning or the end. In other instances, where the date is definitely stated to be after the end, the length of the period is not mentioned, and therefore the cases cannot be compared with others where the date is definitely stated from the beginning. The value of the cases reported by Storer (*Boston Med. and Surg. Jour.*, 1900, vol. 142, p. 397), which are by far the largest number given in any one instance, is somewhat depreciated for this reason. There appears to be no doubt, however, that intermenstrual pain occurs always about the middle of the intermenstrual period, and extends into the second half of it. In nine cases the date of the pain was given as "midway" and in two of these, which were in my own practice, the pain was so exactly between the periods that the date of the approaching one could be foretold from the day upon which the intermenstrual pain appeared; that is to say, if the intermenstrual attack occurred on the twelfth day after the beginning of menstruation, the next period would be upon the twenty-fourth day. The following record taken from one of these cases illustrates this point:

Menstruation	December	1		
Intermenstrual pain	"	10	Interval	9 days
Menstruation	"	19	"	9 "
Intermenstrual pain	"	30	"	11 "
Menstruation	January	10	"	11 "
Intermenstrual pain	"	21	"	11 "
Menstruation	February	1	"	11 "
Intermenstrual pain	"	17	"	16 "
Menstruation	March	5	"	16 "

In another case, reported by Sorel (*Arch. de toc. et de gynec.*, 1873, vol. 14, p. 269), a record of this kind was kept, extending over one hundred and forty-seven periods, and although the intermenstrual pain did not occur with the absolute exactness shown in the two cases just mentioned, it varied distinctly according to the date of the menstrual period which was to follow.

Out of seventeen cases in which the intermenstrual pain was dated from the beginning of the preceding menstruation there were only four in which it was stated whether menstruation occurred regularly every twenty-eight days, and in the absence of this information it is impossible to estimate the relation of the pain to the approaching period. Further information as to the date of intermenstrual pain in relation to the following menstrual period is much needed, if definite conclusions on this point are to be drawn. All that can be said at present is that there seems good reason to think that the date of intermenstrual pain is associated with the menstrual period following the pain rather than that preceding it.

Character of Pain.—No special form of pain is present. In some cases it is noted as dull and in about an equal number as sharp; in only a few cases was it paroxysmal.

Duration of Pain.—This varies from a few days up to the whole time between the occurrence of the pain and the appearance of the next menstrual period. In the majority of cases it lasts three to four days.

Period of Time which the Condition May Last.—This also varies. In one case it had existed only a few months when the patient came under observation, while in another it had lasted twenty-two years. There was one case (Sorel, *loc. cit.*) where it began with the first menstruation and ceased only with the menopause. In no case was it self-limited.

Presence and Nature of Discharge.—In thirty-nine cases out of sixty-four a discharge was present. Its character varied greatly, being sometimes a simple leucorrhea, sometimes clear and watery, and sometimes yellowish and irritating. In a few cases it was bloody or blood-stained. Attempts have been made to establish a relation between the intermenstrual pain and an accompanying discharge, but there seems nothing to support such an idea. The fact that in three out of six cases in which the discharge was bloody or blood-stained there was an endometritis, a polyp, or a submucous fibroid, suggests strongly that in cases where a discharge exists it is connected with associated lesions, and not directly associated with the intermenstrual pain.

Menstruation.—Intermenstrual pain does not seem to be in any way associated with dysmenorrhea. In twenty-seven cases menstruation was noted as painful, while in twenty-three it was painless. In the remaining cases this point was not recorded. It was regular in a good many more cases than it was irregular, and such irregularity as occurred was in the line of anticipation. In only one case was it noted as delayed. There was a tendency to excess in fifteen cases, in contrast to four where the flow was scanty. On the whole, however, menstrual variation is a point upon which information is lacking, and special attention to it in future reports is desirable.

Location of Pain.—In a large proportion of cases the intermenstrual pain was situated, roughly speaking, in one or the other ovarian region; in two it was in both ovarian regions at the same time; while in five it was in the right and left regions alternately.

Relation between Pain and Lesions Found on Examination.—The lesions observed in cases of intermenstrual pain are somewhat indefinite in character. In a good many cases nothing which could be considered a lesion was present. In those where lesions or abnormalities existed there was sometimes a relation between its nature and the location of the pain, and sometimes none whatever. For instance, out of twenty-four cases where the pain was situated in the region of the ovary, there were eight in which there was tenderness and thickening of the ovary; one of hematoma of the ovary; one of hydrosalpinx; and one of salpingitis. There were also five cases in which there was tenderness, with or without swelling, in the broad ligament on the side corresponding to the pain. Of the remaining eight cases in which the pain was situated in the ovarian region, no deviation from normal could be detected on examination. Of eight cases where the pain was situated in the hypogastrium, one was a double salpingitis and another a double salpingo-ovaritis. Of the remaining six cases of hypogastric pain, one was recorded as normal, four were displacements of the uterus, and the remaining case was a large fibroid. Of six cases where the pain was stated to be "in the lower abdomen," there were five displacements, and of the sixth there is no record. In all the remaining cases (thirty-four) the records are too indefinite to be available for use as statistics. So far as they go, then, these results would seem to indicate that intermenstrual pain is not necessarily related to any one location, but rather that the location is determined by the coexisting abnormal conditions.

Treatment and its Results.—The results of treatment in intermenstrual pain, so far, are discouraging. In no case in my collection has it shown itself self-limited, while in one case (Sorel, *loc. cit.*) it lasted throughout the whole menstrual life. Of the various modes of treatment adopted, the results are as follows: Dilatation and curettage was tried in eleven cases, entirely without benefit, except in one instance where the uterus was steamed out after it, and in this case the intermenstrual pain had lasted but a few months. Ovarian, parotid, and thyroid extracts were given in one case without relief, but in another the thyroid alone was followed by complete recovery. Electricity over the ovarian region was tried in four cases, two of which were somewhat improved, while the other two derived no benefit whatever. Removal of one ovary and tube was tried in four cases where the localization of pain in the ovarian region seemed to indicate it. In one instance the pain was relieved for a period of eight years, and in another it has now been absent for six; the other two cases were entirely unbenefited. The appendages were removed on both sides in five cases, two of which were among the cases mentioned where one ovary was first removed without benefit. The results in one instance are not definitely stated, although, judging from the context, they were good; of the other four cases, three were entirely relieved and the other not at all. In the latter instance, however, menstruation continued after the operation and it is to be supposed that some ovarian tissue remained behind. Suspension of the uterus was tried in three cases of retro-displacement, with complete relief in one case, partial relief in another, and none at all in the third.

Partial relief was also obtained in three cases from a course of baths or medicinal waters; in one case from absolute rest in bed during the attacks of pain, with straightening of the uterus, which was in extreme anteflexion; and in one case from the use of a Hodge pessary for extreme anteflexion, together with the relief of a coexisting endometritis.

Complete relief resulted in one case from the use of an intra-uterine pessary for marked anteflexion; in two cases from six months' treatment for endometritis, nature not stated; in one case from the cure of an eroded cervix; and in one from rest in bed during the attacks, with support of the uterus by tampons.

All that can be determined from these records is that the treatment of coexisting local conditions will sometimes relieve intermenstrual pain. It should always be tried, together with attention to general health and absolute rest in bed during the attacks of pain. In regard to the effect of the removal of one ovary and tube, the results are too scanty to warrant an opinion. Removal of both appendages can probably be depended upon to give relief as a last resort, provided the pelvis is not so matted with adhesions as to make complete removal impossible. It would be interesting to know the effect of inducing the cessation of menstruation by removing the uterus without disturbing the ovaries.

I give here three illustrative cases from my own records:

Case I.—Mrs. J., age thirty, November 13, 1894, Case-book V, No. 113. This patient had had three children, the youngest of whom was six years old at the time she consulted me. At the birth of her second child, eight years before, the perineum was badly torn, and it was repaired some little time later. The second menstrual period after the operation was followed by the intermenstrual pain, which had occurred regularly since then. It appeared exactly between each two menstrual periods, so much so that if it occurred on the thirteenth day from the beginning of menstruation, the following menstrual period was on the twenty-sixth. The pain was situated in the lower abdomen and lasted from six to twelve hours. Menstruation was regular, painless, and somewhat free. Just before the intermenstrual pain began, there was a yellowish discharge from the vagina, which lasted until the pain was over. On examination of the pelvic organs the uterus was found anteflexed and the outlet torn through the sphincter. The ovaries and tubes were free from disease. The outlet was repaired at the Johns Hopkins Hospital, and in April, 1907, when the patient was last heard from, she was still suffering from the attacks of intermenstrual pain, although for the last three or four years they have been much less severe than formerly. Her general health is much improved.

Case II.—Miss W., age thirty-nine, October, 1897, San. No. 512. This patient began to have intermenstrual pain when she was eighteen years old, four years after menstruation began. The pain occurred on the fourteenth day after the beginning of menstruation. It was situated in the right ovarian region and was dull in character, with a sense of weight. Menstruation was comparatively painless, a little frequent, but not excessive. There was a constant leucorrhea, which was increased with the intermenstrual attacks. On examination the uterus was found sharply retroflexed. Suspension of this was followed by rapid recovery with entire relief of intermenstrual pain and great improvement of general condition. The patient is now (1907) in excellent health.

Case III.—Miss L., age thirty-nine, February, 1900, San. Nos. 929 and

1,226. Intermenstrual pain began a year before she consulted me. The first attack was accompanied by a rise of temperature to 102° F. After the second attack the pain in the pelvis became habitual, with exacerbations at the intermenstrual periods. The pain was situated on the right side of the pelvis with a focus of greatest intensity over the region of the right ovary. There were occasional paroxysms of extreme pain in the rectum, extending up through the right side of the pelvis. Each intermenstrual attack was accompanied by headache, nausea, and nervous exhaustion, and also by a yellowish irritating discharge from the vagina, which was sometimes blood-stained. Menstruation was painful, and after the habitual pain set in became profuse and frequent. Examination showed a small fibroid uterus and considerable tenderness over the base of the right broad ligament, exactly corresponding to the focus of the pain. Dilatation and curettage relieved the menorrhagia, but not the intermenstrual pain. The various gland extracts were tried without benefit; nor was there any relief from electricity or vesication over the right ovarian region. The patient's health became much affected from the incessant pain; she lost nearly thirty pounds and had a haggard appearance. About eighteen months after she was first seen the right ovary and tube were removed. Nothing abnormal was found on opening the abdomen, and the appendages, except that they were swollen and congested, presented nothing abnormal. Relief from pain was immediate and the patient's general health was completely reëstablished.

In concluding the consideration of this subject I may say that a study of these cases leads me to form an opinion substantially in agreement with that of Priestley, namely, that intermenstrual pain is definitely associated with the physiological changes in the ovary which result and end in ovulation. This view, of course, makes intermenstrual pain depend upon the menstrual period which follows, rather than upon that which precedes it, although it is usually associated with the latter in recorded cases. But the fact that the cases in regard to which I have fullest data all show a definite connection with the succeeding menstruation is one reason for my opinion.

Moreover, the other opinions expressed as to the cause of intermenstrual pain do not seem to be tenable. For instance, it has been claimed that it is purely a nervous manifestation; but if this were the case, the removal of both appendages would in all probability be followed by nervous manifestations in some other region of the body, in other words, by a change of neurosis, whereas it gives complete relief. Furthermore, the fact that the absence of ovulation during pregnancy and lactation is accompanied by a cessation of intermenstrual pain supports the view that the ovaries are directly concerned in it. It has been suggested that intermenstrual pain is associated with fibroid tumors, and one observer claims that he has observed a swelling of fibroids during an attack of pain; but out of the sixty-four cases just considered there were only six of fibroid tumors. Croom (*Edin. Med. Jour.*, 1896, vol. 1, p. 703) agrees with Priestley in associating intermenstrual pain with ovulation, but whereas Priestley connects it with the process of preparation for approaching ovulation accompanied by menstruation, Croom believes that ovulation takes place at the time of intermenstrual pain, independent of menstruation. It is difficult to see, in this case, why the date of intermenstrual pain should vary in accordance with the menstrual period following it; moreover, it is hardly possible that ovulation would take place regularly between two menstrual periods for a number of years, and even through the whole of sexual activity.

Everything, in fact, which is known in regard to intermenstrual pain, thus far, seems to support the theory which associates it with approaching ovulation, taking place under difficulties which are, as yet, imperfectly understood. Should Fränkel's theory as to the relation between the corpus luteum and menstruation prove correct, some light may be incidentally thrown upon the etiology of intermenstrual suffering.

Further knowledge of the subject must depend upon information furnished by a large number of records, and it is greatly to be wished that all cases of intermenstrual pain should be carefully observed and duly reported. I am convinced that such cases are much more numerous than they are supposed to be.

The points which should be noted are: (1) Age of patient; (2) married or single; (3) children or miscarriages; (4) date at which intermenstrual pain occurs, with special reference to following menstrual period; (5) length of time pain has lasted; (6) location of pain; (7) duration of pain; (8) character of pain; (9) age at which pain began; (10) condition of menstruation as regards pain, regularity, and amount; (11) presence and nature of vaginal discharge; (12) results of pelvic examination or of abdominal section; (13) treatment and its effect.

CHAPTER VI.

AMENORRHEA.

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(2) Causes of primary amenorrhea: Maldevelopment, p. 126; atresia, p. 128.
(3) Causes of secondary amenorrhea: Physiological, p. 131; mechanical, p. 131; constitutional, p. 132; functional, p. 135.
(4) Symptoms and diagnosis, p. 136.
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(6) Vicarious amenorrhea, p. 146.

Definition.—Amenorrhea, or absence of the menstrual flow, is a symptomatic condition accompanying a variety of affections. It may be broadly divided into two classes: one in which menstruation fails to appear at the usual age, and one in which it ceases after it has been established. The first of these is known as primary amenorrhea, or *emansio mensium*, and the second as secondary amenorrhea, or *suppressio mensium.*

CAUSES OF PRIMARY AMENORRHEA.

The non-appearance of the menstrual flow at the customary age is always a matter for serious consideration. There are two different conditions from which it may arise: (1) failure of development (aplasia or hypoplasia) on the part of the reproductive organs; (2) atresia, causing obstruction of the genital tract of some sort. The second class is not, strictly speaking, an amenorrhea at all, but a retention of the menstrual fluid; it is convenient, however, for practical purposes, to consider such cases under this head.

Maldevelopment.—Amenorrhea due to failure of development is really a rare condition, although its existence is often assumed. It is to be suspected in the case of a young girl in her teens, who has never menstruated, and is easily demonstrated by a local examination, when the uterus will be found to have a characteristic shape, the cervix being large and disproportionately long, while the fundus is small and infantile in type. The following case is of this kind:

Miss McC., age nineteen (San. No. 2396), March, 1907. The patient had had complete amenorrhea for three years; before this date menstruation had been regular and painless, but always scanty, lasting only one day. The abdomen was opened for the purpose of removing the appendix; the right kidney was also suspended. On examination the external genitalia, vagina, and cervix uteri were found normal, while the uterus, ovaries, and tubes were infantile in type. The ovaries were elongate, white, smooth, and sclerotic. The right ovary measured 4 × $1\frac{1}{2}$ × $1\frac{1}{2}$ cm. No corpus luteum was present.

In cases where there is aplasia of both uterus and ovaries there will be no attempt at ovulation, and therefore no symptoms of menstruation. If, on the other hand, there is aplasia of the uterus while the ovaries are healthy and functionally active, ovulation will take place as usual and will be accompanied by the customary menstrual molimena, namely, pelvic pain, headache, and nervous manifestations of different kinds, recurring at intervals of about four weeks. As the uterus is incapable of responding, no relief is afforded by the customary discharge, and the patient's sufferings often increase until her general health is impaired.

Cases in which amenorrhea is associated with the absence of one or more of the organs of generation must be included in this class, as well as those in which diseased conditions have caused sufficient degeneration of the ovaries to destroy their function before puberty. A case of this kind, in which, as sometimes happens, the patient was to all appearance perfectly developed physically, is given by W. B. Chase (*Amer. Jour. Obst.*, 1898, vol. 38, p. 512).

The patient was a married woman, twenty-four years old, of fine physical development, and apparently in good health, although she had never menstruated. She had been married about two years and had had no prospect of children. When she was about eighteen she began to have attacks of pelvic pain, accompanied by headache and nervous excitability, which recurred regularly every four weeks. These attacks gradually increased in severity until her sufferings, especially from headaches, became so severe that she and her family feared insanity. During the preceding year she had perceived an abdominal enlargement and could clearly define a tumor. On examination the growth was easily perceptible, though the abdominal walls were fat; it was as large as a five months' pregnancy. All the rational indications pointed to a uterus distended with menstrual fluid from atresia of the cervix, but the uterus, which was pushed up under the pubes, admitted the sound to the usual depth. As the patient was anxious for any operation which offered a prospect of relief from her sufferings, the abdomen was opened, when the pelvic contents were found to be almost completely walled off by peritoneal adhesions, although the patient was never conscious of having had peritonitis. Two tumors were found, one a multilocular ovarian cystoma attached to a smaller growth containing a shrunken ovary the size of a large lima bean, within which was a corpus luteum. The other tumor was a dermoid cyst, containing hair and sebaceous material, which had entirely usurped the place of the right ovary. Neither of the uterine tubes could be found. It was plain that the futile attempts at ovulation with its attendant suffering, as well as the womanly development, had been occasioned by the presence of the small amount of ovarian tissue left in the cystoma.

Atresia.—In primary amenorrhea arising from atresia of the genital tract, the obstruction may exist at any point, that is to say, there may be an imperforate hymen, an atresia of the vagina, or (rarely) an atresia of the cervix. In such cases ovulation, when it begins, is accompanied by menstruation, and as it is impossible for the menstrual flow to escape, it collects behind the point of atresia, causing distention first of the vagina, then of the uterus, and finally of the uterine tubes. The customary menstrual molimena are present and are sometimes accompanied or followed by bleeding from the nose, or some other mucous membrane. At first the suffering is slight, but with each recurring period it increases until the patient's general health is, in some cases, considerably impaired.

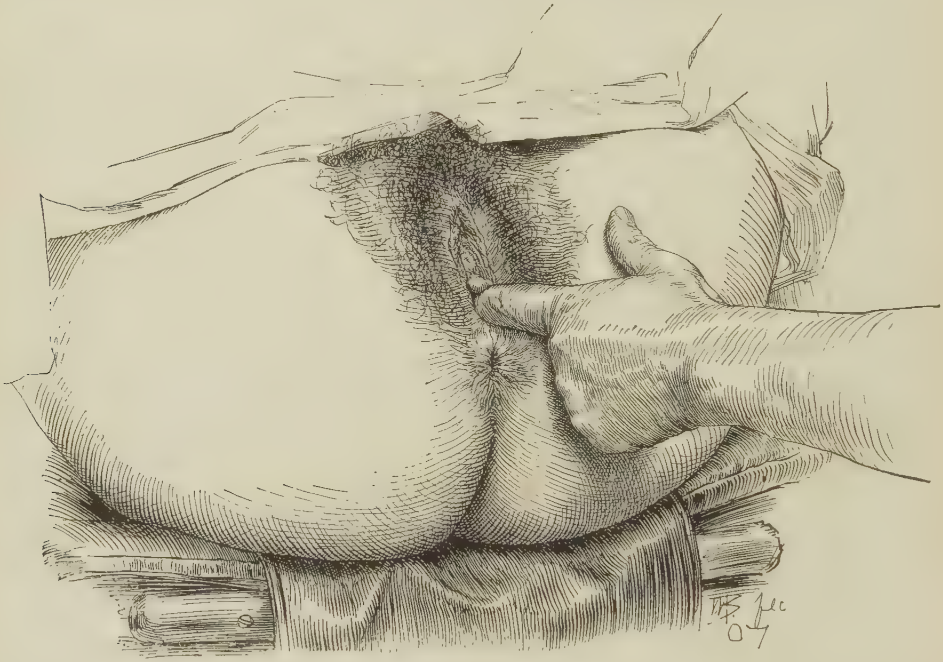

Fig. 55.—A Case of Atresia of the Vagina. The tip of the index finger rests at the vault of the vagina showing great shortening.

A congenital atresia, with absence of the vagina above the point at which the tip of the finger rests, is shown in Figure 55. Figure 56 shows the depth to which a shallow vaginal pocket can be thrust into the pelvis by blunt pressure from without. This patient was married and came to me to consult me for sterility. Atresias of the genital tract resulting in primary amenorrheas were not long ago considered to be always congenital, except in the rarest instances; within the past twenty-five years, however, it has been shown that most of them are really the result of infectious inflammatory processes, originating for the most part in the acute infectious diseases, especially typhoid and scarlet fevers. This subject is more fully discussed in Chapter X; I cite here, however, one illustrative case related by L. Pincus (*Monatsschr. f. Geb. u. Gyn.*, 1903, vol. 17, p. 751).

A young girl, seventeen years of age, who had never menstruated, had been ill for some weeks with a mild attack of typhoid fever, when she suddenly complained of severe pain over the symphysis. An area of resistance about the size of a fist had already been discovered in that locality. The pain now complained of was at first ascribed to an effort at menstruation, and this idea was confirmed by the patient's having a discharge of thick, brownish blood from the genitalia a few hours later. Shortly after this occurred she became worse, and within twelve hours she died, with every indication of peritonitis due to perforation. No autopsy was permitted, but an examination of the external genitalia, made shortly before death, showed a slight tear in an otherwise closed hymen. The patient's mother said that her daughter had been in the habit of having attacks of abdominal pain resembling colic for the past few years; she also stated that about four and a half years before her daughter had had an attack of scarlet fever, and, for some time after her illness, there was a discharge from the vagina. It was clear that the scarlet fever had set up an inflammatory process in the vagina inducing an atresia retrohymenalis,

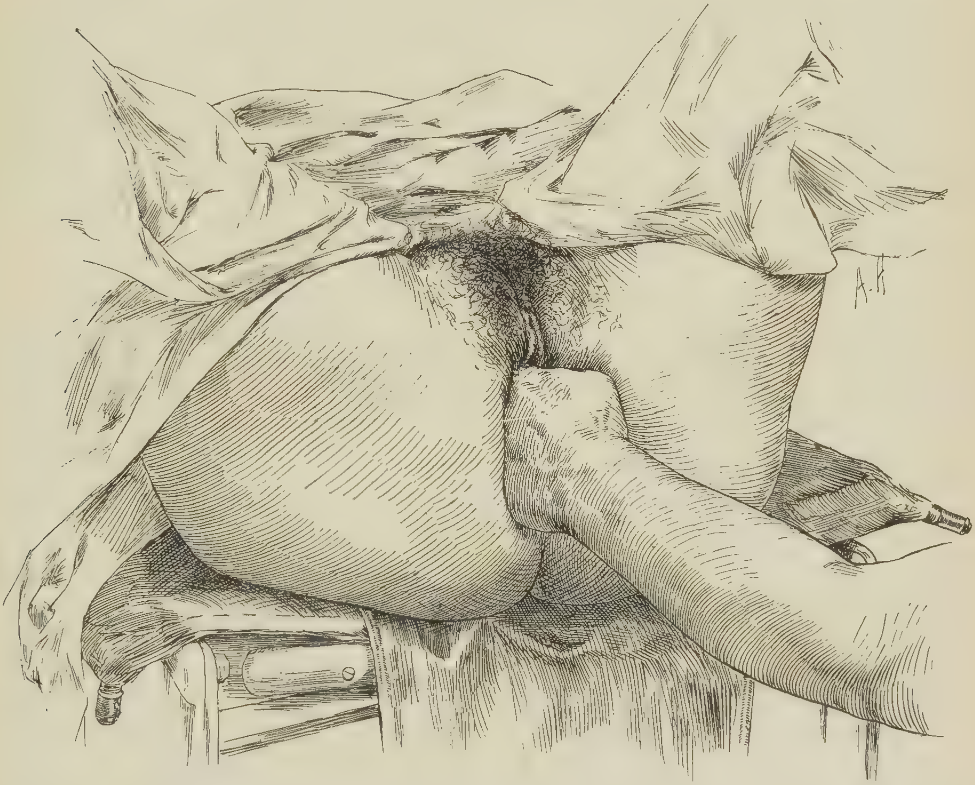

Fig. 56.—The Same Case of Atresia. The examiner is pushing in the index finger and showing the potential lengthening of the vagina under strong blunt pressure from without.

with imperforate hymen, and this resulted by degrees in hematocolpos, hematometra, and probably hematosalpinx. The typhoid fever induced a menstrual flow, or an atypical metrorrhagia, and resulted in a rupture of the tubes and of the closed hymen.

The atresias of childhood are, for the most part, of a harmless character, consisting of a conglutination of the labia in their inner surface. This cohesion is continued up to and above the level of the urethra, where there is an opening, through which the urine escapes freely and by which the menstrual discharge may escape, later on, without difficulty. I take it that the origin of the adhesion of the nymphæ in the case of a woman who had borne children (see Fig. 57) is susceptible of no other explanation. Here the marital relation and labor have destroyed all the lower part of the cohesion, leaving only this tell-tale bridge behind.

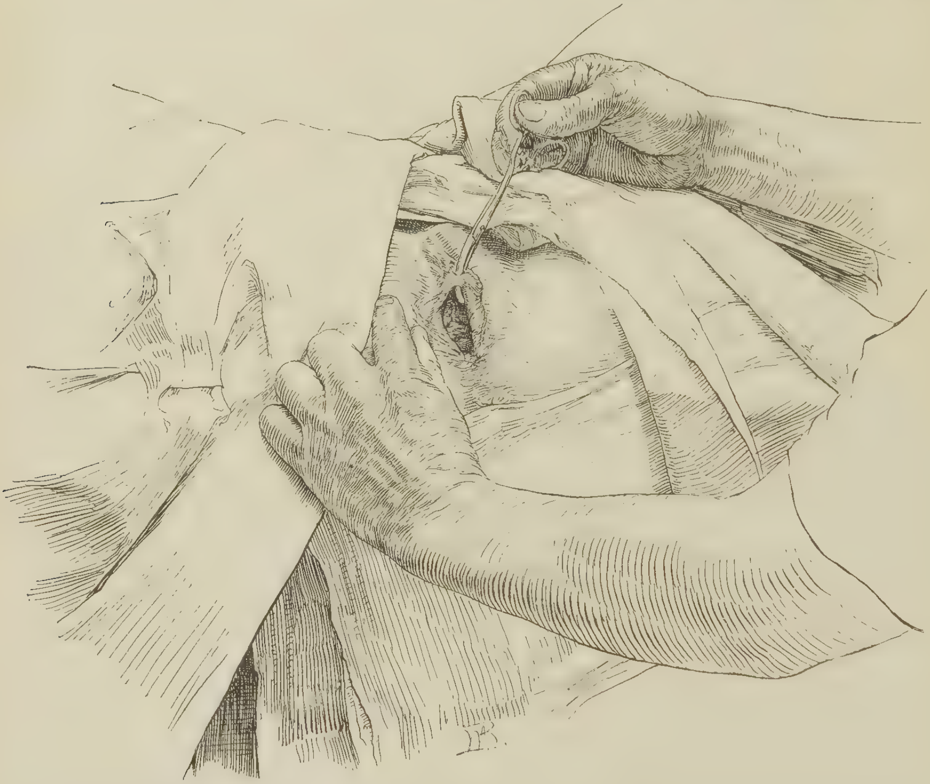

Fig. 57.—A Conglutination of the Labia Minora Just Below the Clitoris and Above the Level of the Urethra. This is quite certainly the remains of an extensive adhesion in childhood, of which the lower part has been ruptured, while the tell-tale bridge, in a protected situation above, lingers to tell the story of the original condition.

J. C. Nott in 1843 called attention to a form of atresia of the vagina arising in young infants without any demonstrable cause (*Amer. Jour. Med. Sci.*, 1843, vol. 5, p. 246). He cites two cases of infants, perfectly normal at birth and healthy in every respect, who were found several months later to have a closure of the vagina. In neither case was there any history of inflammation; and in both the vagina opened spontaneously in the course of a few months.

In addition to these two distinct classes of primary amenorrhea, every physician is familiar with cases where absence of menstruation at the usual age is occasioned by general backwardness of development, arising from constitutional weakness or else following an acute disturbance of some kind. These cases are usually recognizable from the history, as well as from the general appearance of the patient. In considering this group it must always be borne in mind that in some families puberty is unusually late, without any definable reason for the delay.

CAUSES OF SECONDARY AMENORRHEA.

Secondary or acquired amenorrhea may arise from a variety of causes, which can be classified as physiological, mechanical, constitutional, and, what may be called for want of a more definite name, functional.

Physiological Amenorrhea.—The great physiological cause of amenorrhea is pregnancy, a fact which should always be borne in mind; for, unless it is kept first on the list of possible causes, disastrous mistakes will be made, especially by those who undertake a course of active local treatment. Amenorrhea is usual, though not invariable, during lactation, and it should cease with its conclusion. Prolonged lactation, however, as Vineberg points out, sometimes results in atrophy and consequent amenorrhea which persists after lactation is over. The other physiological causes of amenorrhea are childhood and the menopause. During childhood the whole organism is undergoing those changes which eventually express themselves in ovulation; while the menopause represents the physiological relief from the cyclic changes which follow the exhaustion of the reproductive system.

Mechanical Amenorrhea.—This form includes cases of character similar to those just described under the primary amenorrhea due to atresia. Obstruction of the genital canal may occur after the establishment of menstruation as well as before its appearance, resulting in like manner in the suppression of the flow. Imperforate hymen is the only atresia of the genital tract belonging exclusively to the class of primary amenorrheas. Obstruction at points above the hymen may result from an infection, although the fact that infectious diseases are so much more frequent in childhood makes this factor less frequent than it is in primary amenorrhea. There are other causes, however, which can arise only after sexual maturity, or even in some instances, after parturition. Not a few cases of atresia of the vagina or cervix are due to necrosis following difficult labor, while the prolonged or injudicious use of pessaries is another cause. Jacobson (*St. Louis Courier of Med.*, 1906, vol. 34, p. 58) has seen several cases of atresia from this cause. Under the head of mechanical amenorrhea we must also include those cases in which there is a failure in development of the genital organs sufficient to render menstruation infrequent and scanty, appearing in some instances only a few times during the whole period of reproductive activity, although it is not enough to suppress the function altogether.

It may also be caused by burns, scalds, or by the application of too strong caustics to the vagina or the cervix. Sir J. Y. Simpson has reported a case in which atresia of the cervix was occasioned by the application of the actual cautery to the edges of a vesico-vaginal fistula, caused by extensive sloughing of the upper part of the vagina after childbirth ("Diseases of Women," 1872); and Veit mentions a case in which cicatrization took place in a short time from the application to the vagina of a tampon soaked in a fifty per cent solution of chloride of zinc.

Constitutional Amenorrhea.—This form is found in almost all diseased conditions, acute or chronic, which make heavy demands upon the vital forces. Such a repression has always been regarded as a conservative effort on the part of nature to preserve the patient's strength; in a few instances, however, it has been shown that the morbid condition is associated with an atrophy of the genital organs. Thorn (*Zeitschr. f. Geb. u. Gyn.*, 1889, vol. 16, p. 57) considers that in all exhausting diseases there is a temporary atrophy of the uterus and ovaries which is the immediate cause of the amenorrhea, and he cites a number of cases to establish his point.

Chlorosis.—The commonest constitutional cause of amenorrhea is chlorosis. W. Stephenson in 1889 (*Trans. Obst. Soc.*, London, 1889, vol. 31, p. 104) called attention to the fact that this disease was too much neglected by gynecologists and the same accusation might be made to-day. As a constitutional disorder, chlorosis falls under the domain of general medicine, but, owing to the disturbances of menstruation, whether amenorrhea or menorrhagia, which are among its distinguishing features, it has certainly a claim upon the attention of the gynecologist.

Chlorosis, as defined by Stengel (*Twent. Cent. Med.*, vol. 7, p. 326), is "primarily a blood disease dependent upon disturbances of the hematopoetic system"; "not a disease resulting from blood destruction, but rather from imperfect hematogenesis." The ultimate causes of the imperfect blood development are obscure. The disease is characterized clinically by a deficiency in the hemaglobin of the red blood corpuscles greatly in excess of the diminution in their number; a peculiarity first pointed out by Duncan in 1867. In the early stage of chlorosis the number of red corpuscles may be hardly below normal, even though the hemoglobin is extremely reduced, but, as the disease progresses, the number of the corpuscles diminishes, while the striking disproportion between them and the percentage of hemaglobin persists. The reduction in the hemoglobin, as Stengel says, is primary, the reduction in the corpuscles secondary. The shape of the red corpuscles is often changed, and the specific gravity of the blood is usually reduced in proportion to the diminution of the hemaglobin. The total amount of blood is not diminished and some observers claim that it is increased. No special changes are observed in the white corpuscles and they are not increased as in other forms of anemia.

The causal relation between chlorosis and disturbances of menstruation is not yet understood. Virchow in 1872 showed that it was associated with an imperfect development of the heart and large arteries and also, in many cases, with imperfect development of the sexual organs. He considered that the defective development of the circulatory system was primary, while that of the sexual organs was secondary. Rokitansky, on the other hand, believed that chlorosis was necessarily associated with imperfections in the development of the sexual organs. Fränkel (*Arch. f. Gyn.*, 1875, vol. 7, p. 465) showed that in certain cases of chlorosis there was an imperfect development of the genital organs while the heart and other organs were normal. Stephenson (*loc. cit.*) insisted that the imperfections in the evolution of menstruation observed in chlorosis constitute as constant a feature in the disease as imperfections in the evolution of the red blood corpuscles. He also agreed with Virchow in believing that a special diathesis or peculiarity of constitution predisposing to the development of the disease was present in most cases.

The general trend of opinion in the present day is to the effect that the amenorrhea almost always present in chlorosis is the result of the impoverishment of the system, as in simple anemia. It is difficult, however, to reconcile this view with the intimate relation between chlorosis and the sexual system. The fact that the disease is hardly ever met with in childhood or after the menopause and that it makes its appearance at periods corresponding to epochs of special significance in the sexual life of women, speak strongly in favor of a direct relation between it and the reproductive organs, of which the menstrual disturbance is but the outward expression. The majority of cases of chlorosis occur between the ages of fourteen and twenty-one, which is the time when the sexual function is established; while there is a small number of cases in which it occurs (or recurs) between the ages of twenty-four and thirty-five, the period of full sexual maturity and greatest reproductive activity.

Complete amenorrhea is not common in chlorosis. In most cases the flow appears at long and irregular intervals and is extremely scanty. In sixty-five cases examined by Hayem, menstruation was diminished in thirty-six, and completely suppressed in twenty-four, while in four it was normal or a little increased. In a few rare cases chlorosis is accompanied by profuse menstruation, and both Virchow and Fränkel have pointed out that in such cases the ovaries are hypertrophic instead of being of the usual infantile type (see Chap. VII). Contrary to expectation, the establishment of menstruation is early rather than late in chlorotic patients.

Constipation is so often a marked feature in chlorosis that Sir Andrew Clark believed the disease was really due to a copremia from absorption of ptomaines and leucomaines from the lower intestine. Emotional and nervous disturbances are sometimes well marked and some writers have held the disease was a neurosis. Disturbances of the heart and circulation leading to syncope, breathlessness, and, possibly, cyanosis, are present.

Tuberculosis.—A frequent cause of constitutional amenorrhea is tuberculosis. The disturbance of the function dates from the earliest stages of the disease, and the patient and her relatives not infrequently regard the amenorrhea as the cause instead of the result of the tuberculosis.

Acute diseases of all kinds, infectious or otherwise, are frequently accompanied by amenorrhea, which usually lasts through convalescence until health is re-established.

Anemia, both primary and secondary, is usually attended by suppression of menstruation, more or less complete, and it also occurs after loss of blood from any cause, especially after post-partum hemorrhage, when the patient may not menstruate for months after she has resumed her normal habits of life. Malaria is an occasional cause of amenorrhea and should always be suspected in districts where it prevails.

Syphilis, chronic nephritis, and diabetes mellitus and insipidus are all occasionally accompanied by amenorrhea.

Chronic digestive disturbances which impair nutrition may be associated with cessation of menstruation, especially gastric ulcer.

In the various maladies now held to be caused by disease of the glands concerned in the internal secretions, amenorrhea is often a symptom, but whether in these cases it is simply a conservative effect or whether there is some direct connection between these disorders and the sexual organs is not yet known. Atrophy of the uterus is often noted in acromegaly according to Veit. Kleinwächter has shown that in Basedow's disease there is a general atrophy of the genitalia both external and internal (*Zeitschr. f. Geb. u. Gyn.*, 1889, vol. 16, p. 144), and his observations have been confirmed by Theilhaber (*Arch. f. Gyn.*, 1895, vol. 49, p. 57).

Obesity is an occasional cause of amenorrhea. In a case reported by Lomer (*Centrbl. f. Gyn.*, 1893, vol. 17, p. 641) the patient gained fifty pounds in six months and became so corpulent that she could hardly move. She complained of dizziness, flushes of heat, and bleeding at the nose. Scarification and blood-letting at the external os uteri relieved the symptoms. Whenever a young woman who complains of amenorrhea is much above the average weight for her age and height, especially if the increase coincides with the cessation of menstruation, the physician will do wisely to turn his attention to the vices of nutrition which are responsible for the obesity. The increase of weight is considered to be akin to that often seen at the menopause, both being associated with a repression in the activity of the uterus and ovaries. H. C. Coe (*Med. Rev. of Revs.*, 1906, vol. 12, p. 506) suggests that an amenorrhea associated with obesity may be nothing but an early symptom of the obscure disorders arising from disturbances of internal secretions, and that the recognition of this fact may be of service in making an early diagnosis. He cites an illustrative case in which amenorrhea, accompanied by a marked increase in weight, preceded acromegaly, and further the case of another patient, under treatment for Hodgkin's disease, where irregular and scanty menstruation ending in complete amenorrhea lasting for some time preceded the glandular enlargement. There was a little anemia present in the last case, but not enough to account for suppression of menstruation.

Chronic poisonings, particularly of lead, occasion amenorrhea. The habitual use of opium or morphin induces in time a more or less complete cessation of menstruation. The use of alcohol at first increases the menstrual flow, but eventually it may check it, in consequence of degenerative changes in the tissues.

Attention has been called by W. H. Baldy to the possibility of amenorrhea arising from the uric acid diathesis (*Phil. Med. Summ.*, 1903–4, vol. 25, p. 239) which it is well known may occasion dysmenorrhea.

Functional Amenorrhea.—The term functional is used to define that form of amenorrhea in which a patient with normal generative organs and in average health, ceases to menstruate without any apparent objective cause, local or constitutional. Excitement, shock, or sudden fright will act to cause menstruation to be delayed or missed altogether. I have known a case where a period was missed from no other apparent cause than the loss of several nights' sleep just at the time its appearance was expected. The mere expectation of pregnancy sometimes acts to prevent the flow in the case of unmarried women who have exposed themselves to the risks of it. It often happens in such cases that the next succeeding period appears normally. Again, an intense desire for children may focus the attention upon menstruation and so control the function as to suppress it entirely, leading to the confident hope that pregnancy has taken place. Haultain (*Edin. Med. Jour.*, 1900, vol. 2, p. 339) advances the idea that amenorrhea of the kind known as functional is the effect of an impairment of controlling nerve centres.

Another form of amenorrhea is that due to changes of climate. It is a matter of common observation that differences of climate or altitude occasion disturbances of menstruation, a change to the seashore being generally accompanied by an increase in menstrual flow, while that to a higher altitude may be attended by the reverse. Tilt says that he was once consulted by a lady, who had shortly before established a large boarding school for girls near London, because so many of her scholars who came from a distance suffered from amenorrhea that she feared there was something unhealthy in the location. This class of cases, as well as those arising from shock, fright, or excitement, are explicable on Haultain's theory. Over-study and exhaustion of the nervous system are also frequent causes of functional amenorrhea. Exposure to cold during a menstrual period with a consequent sudden stoppage of the flow, which may or may not return next time, is usually classed as a functional amenorrhea.

Besides the causes of amenorrhea cited, there are certain cases in which menstruation occurs at irregular intervals for which no definite reason can be assigned. Could we follow the evolution of the corpus luteum in these cases we should probably be able to understand better the causal nexus; the first step is to determine whether Fränkel's theory as to the relation between menstruation and the corpus luteum can be established.

SYMPTOMS AND DIAGNOSIS.

Amenorrhea in itself is only a symptom common to a variety of conditions, and in many cases where it is the sole clue the physician must follow the various possible causes until he discovers the particular condition which is effective in the case under observation.

In a case of primary amenorrhea the first question to be considered is whether there is maldevelopment of the pelvic organs, or an obstruction at some point in the genital tract, or whether it is merely an expression of general backwardness of development. The doubt can be set at rest at once by a local examination, but the conscientious physician will hesitate to take this step in the young and unmarried until he is sure it is indispensable. The crucial point is the presence or absence of menstrual molimena. If no such symptoms have appeared the case is either one of backwardness of development or of maldevelopment (aplasia of the reproductive organs). Under these circumstances the physician is justified, if the girl is not more than sixteen or seventeen, in waiting, in the hope that nature and a little attention to general hygiene will remove the difficulty.

If menstruation does not appear within a reasonable time a bimanual rectal and abdominal examination may always be made under anesthesia, when, if the case is one of faulty development, the uterus will be found to be of an infantile type with a small undeveloped fundus and a disproportionately large cervix, while the ovaries are elongate, smooth, and smaller than at puberty (see Fig. 58).

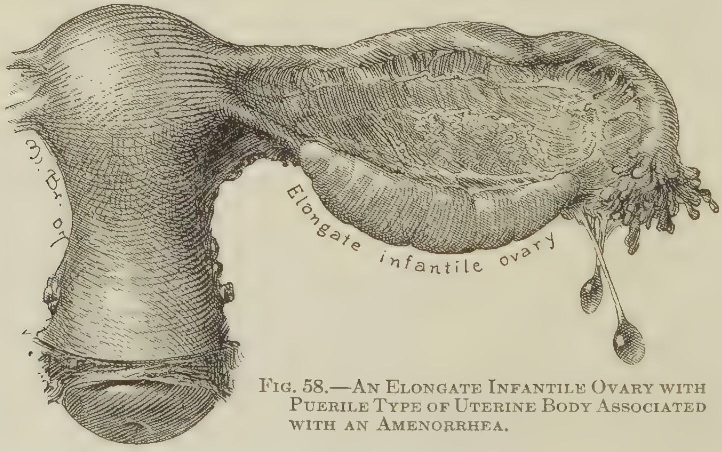

Fig. 58.—An Elongate Infantile Ovary with Puerile Type of Uterine Body Associated with an Amenorrhea.

If, on the contrary, the patient gives a history of recurrent attacks of pelvic pain, headache, dizziness, and nervous excitability, accompanied, it may be, by bleeding from the nose or some other mucous surface, the case is either one of maldevelopment with ovaries functionally active, or of an atresia in the genital tract. Here an examination must be made at once to obviate serious consequences, namely the formation of hematocolpos, hematometra, and hematosalpinx, with rupture and consequent peritonitis.

What harm may arise in such cases from neglect is shown by a case of Gebhard's (Veit's "Handbuch der Gynäkologie," 1898, vol. 3, second half, p. 60). A girl of seventeen with a primary amenorrhea consulted a physician on account of a severe colicky pain in the abdomen. The physician made no inquiry into the menstrual function nor did he suggest any local examination. Inspection of the abdomen showed a painful diffuse tumor above the symphysis extending towards the right, which he took for a perityphilitic exudate; for the relief of this he made an incision in the ileocecal region "to evacuate the pus." Instead of an abscess he found a large circumscribed dark red swelling, looking like an ovarian tumor, which he did not attempt to remove. The patient then entered the clinic where the diagnosis was apparent on the first inspection of the genitals and the tumor was seen to be a large hematocolpos due to an atresia of the hymen. It was relieved by an incision.

Imperforate hymen is at once recognized by the marked bulging tumor of a livid or dark brown color, which fluctuates distinctly upon palpation, protruding between the labia; posteriorly it is limited by the perineum, laterally by the inner surface of the labia, and anteriorly it reaches to the posterior margin of the urethra. If the growth is sufficiently large to fill the lower abdomen, rising as high as the umbilicus, the wave of fluctuation is readily transmitted from above downward to the tumor at the vulva. A rectal examination reveals an elongate sac filled with fluid, occupying the position of the uterus and vagina and conforming in its general direction to the axis of the pelvis. Great care must be taken in the examination not to rupture the thin tubal sacs lest a fatal hemorrhage or an attack of peritonitis should be induced.

Pregnancy must be considered in every case of amenorrhea, coming on in women who have menstruated regularly up to the time of the sudden onset of the suppression, if the patient is still within the child-bearing period. It must also be considered in atypical cases where the menstruation has been irregular. The examiner does not insult his presumably chaste patient by bearing this condition in mind and proceeding at the first step he takes in his diagnosis to exclude it from the category of possibilities in any given case. Pregnancy is diagnosed by recognizing the rotund enlargement of the uterus, sometimes soft and boggy, sometimes firm, but almost always more or less globular. In some cases, it feels as if jointed onto the cervix which may be mistaken for the uterus itself, while the body above, containing the fetus, appears to be a tumor attached to it by a pedicle (see Fig. 59). Hegar has shown that softening of the uterus caused by pregnancy is not symmetrical; the neck retains a certain resistance, when the body has already become soft, and the upper part, which contains the ovum, is tenser than the lower empty part which may be pressed together between the fingers like a soft membrane. This sign is of great importance in the early diagnosis of pregnancy. Anyone acquainted with the extraordinary relaxation of the lower segment in the second or third months will avoid the not uncommon mistake of taking the cervix to be the whole uterus and the pregnant body for a loosely attached tumor, a pregnant tube, cyst of the ovary, etc.

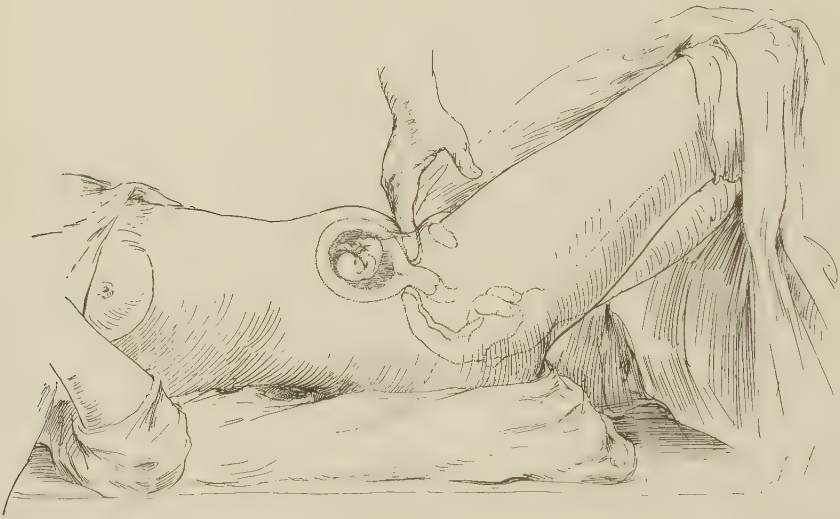

Fig. 59.—An Early Pregnancy showing the Globular Enlargement of the Uterine Body. The cervix is often flexible at the point under palpation and may feel like an organ detached from the semi-fluctuant mass above.

In amenorrhea of women over forty, there is always a possibility of the menopause. Women are prone to assume that "the change of life is working" as early as thirty-five or even earlier, but a cessation of menstruation before forty-one or two is rare and the physician should accept it as a diagnosis only after he has failed to find any other cause and after the lapse of some months. The physiological amenorrheas of childhood and lactation require no comment.

Secondary amenorrheas of the mechanical variety are easily recognized by the existence of menstrual molimena without a regular occurrence of the habitual discharge, and examination shows the nature and seat of the obstruction. There are certain cases of secondary amenorrhea, caused by faulty development, when the defects are not sufficient to cause primary amenorrhea, but menstruation is so far affected that it takes place at infrequent intervals, it may be only a few times in the whole course of the sexual life. The history of such cases is very suggestive and examination makes the diagnosis clear. In patients of this class the physical development as well as the general health is sometimes excellent; on the other hand, the patient may be poorly developed and of a manifestly feeble constitution.

In constitutional amenorrhea the history will generally supply the clue to diagnosis. Chlorosis is the commonest cause and here the appearance is so characteristic as to suggest it at once. The complexion has a peculiar, transparent, waxy, greenish hue, from which the disease derives its name, unlike that of other forms of anemia. The conjunctivæ are unnaturally white and clear and there is usually a disturbed heart's action, manifested in shortness of breath, palpitation, and great fatigue on exertion. When the disturbance of the circulation is marked, there is apt to be more or less congestion of the terminal blood vessels so that the skin has a muddy cyanotic look, which to some extent masks the typical greenish hue. Menstruation is disturbed by a more or less complete amenorrhea; the flow is of a peculiar, characteristic, pinkish color. The age of the patient is a point which must be considered, since the majority of cases occur between fourteen and twenty-one, with a smaller proportion between twenty-five and thirty.

An examination of the blood is always necessary to complete the diagnosis; its appearance as it flows from the body is characteristically thin, pale, and watery. The hemaglobinometer shows that the percentage of hemaglobin is reduced, while the hemacytometer demonstrates that the number of red corpuscles is not diminished proportionately. In a series of ninety-four cases investigated by Dr. C. E. Simon, the average hemoglobin value was forty-two and a half per cent, while the lowest in the series was seventeen and a half per cent. There are certain rare cases of great reduction in the number of red corpuscles. One is mentioned by Hayem, where only 937,360 were counted, and three by V. Limbeck in which the red corpuscles were 1,750,000, 1,850,000, and 1,930,000 respectively.

In the amenorrhea of tuberculosis, patients usually complain of phthisical symptoms, although among the ignorant classes the cough, loss of weight, and other early symptoms of phthisis may escape the recognition of the patient and her family and she may complain of the amenorrhea and nothing more. The suppression of menstruation following acute diseases offers no difficulty in diagnosis. In some chronic conditions the whole body must be carefully examined, as well as the lungs, the sputum, and the blood.

Obesity associated with amenorrhea suggests some vice of nutrition which must be carefully investigated, and the suggestion made by Coe as to disease of the glands employed in internal secretion deserves to be borne in mind.

TREATMENT.

Primary amenorrhea, due to atresia with accumulated menstrual secretions above, is the only form in which there is any necessity for immediate action, and this form of amenorrhea is not really a true amenorrhea at all, although it is conveniently considered under this head. If the general practitioner has convinced himself that an atresia of the genital tract exists he should send the patient without loss of time to a gynecologist. A form of obstruction which may claim the attention of the general practitioner is an imperforate hymen. It is better to refer this class of cases as well as those in which the atresia is situated higher up to a specialist, but as circumstances may arise in which the general practitioner is obliged to deal with this condition himself and as the operation itself is a simple one if performed with extreme antiseptic precautions, I give the details of its execution.

Operation for Imperforate Hymen.—Once more I earnestly insist upon the most rigid asepsis at every step. Lives have been repeatedly lost from sepsis coming on rapidly after opening such accumulations, especially where the tubes have been dilated. The blood adhering to the sac and the thin walls, together with the sudden change in the pressure in the blood vessels, affords material for sepsis, as well as a ready avenue for the invasion of the neighboring peritoneal cavity through necrosis of the thin tubal walls. This danger can be avoided, however, by a thorough cleansing of the field, by care against infecting the tract while operating, and by a thorough packing with iodoform gauze so as to protect the field for some days after the operation. After the external genitals are cleansed and the operator has put on sterile rubber gloves, the bulging membrane is opened by a crucial incision, dividing it into four triangular flaps at its base. The thick tarry fluid is allowed to escape slowly and on no account must it be hastened by pressure from above, for fear of rupture. The canal is then washed out for from five to ten minutes with a warm saturated boric acid solution introduced under low pressure through a long, curved, glass douche nozzle. Pains must be taken to empty the vaginal and uterine cavities of all the accumulated blood. An abundance of iodoform and boric acid powder (1:7) is dusted into the vagina and iodoform gauze loosely laid is packed into the uterus and the vagina down to the vaginal outlet. The urine is drawn, the powder sprinkled on the outside, and a pad of sterilized cotton is laid on and held in place by a sterilized T-bandage. The internal dressings may be left in place for from four to five days or even longer, provided everything is going on well and they do not become saturated sooner. Whenever they are wet and secretions are found to be escaping at the vulva they must be changed by bringing the patient to the edge of the table or bed under a good light, withdrawing the pack with forceps and reinserting it by means of a packer, thus using every precaution to avoid infection by keeping the gauze from all contact with the fingers, the buttocks, etc. By this method sepsis is avoided and the one great danger eliminated. The patient should be kept in bed for from one to two weeks.

Cases where there is maldevelopment of the reproductive organs should also be referred to a gynecologist, although there is not the same need for immediate action as in the case of an obstruction of the genital tract. When the ovaries are able to perform their function while the uterus is too imperfectly developed to respond, there is usually no relief from the constantly recurring suffering except in the removal of the ovaries, but this should only be done in imperative cases, where the suffering is extreme. Galvanic stem pessaries laid within the uterus have been recommended for puerile organs as well as for those cases where menstruation occurs at infrequent, long, or irregular intervals, but without, in my opinion, any reasonable claim. Moreover, as Herman has shown (*Med. Press and Circ.*, London, 1893, vol. 55, p. 269), they often irritate the endometrium, as shown by resulting hemorrhage and leucorrhea, and set up an infection which may spread along the uterine tubes to the peritoneum, setting up a fatal peritonitis. The value of the galvanic current in this form of amenorrhea has been much praised by some writers, the negative pole being applied inside the uterus (Apostoli). I am not prepared to utter a sweeping denial of these claims and I am willing to concede that it is perhaps worth trying for a few months. The cathode shaped like a sound is introduced into the uterus, while the positive pole, a long dispersing electrode, is placed on the abdomen. Treatments of ten minutes' duration are given three times a week; the strength of the current should be twenty to thirty milliampères.

In the amenorrhea of young girls, whether primary or secondary, the treatment should first of all be directed to diverting the patient's attention from the pelvic organs by assuring her and her relatives that a little time and patience will regulate the function. Anemia, often present, must receive consideration. Iron is beneficial in most cases, but there are a certain number in which cod liver oil appears to do more good. Nourishing food and plenty of fresh air and exercise are essential elements in the treatment. In schoolgirls the question of over-study should receive earnest attention. No night study whatever should be allowed, and the amount of work done in school hours reduced to a minimum. In any case where the amenorrhea is obstinate or of long standing and the patient's health is manifestly below normal, it is the wisest plan to take her out of school altogether for some months or a year. The worst that can result from such a course is the delay of a year in graduation, and the disappointment attendant on this is a trivial matter compared to her physical welfare. Great attention must be paid to keeping the bowels open, as constipation is closely associated with amenorrhea. The prescription for constipation given in chlorosis is of use in all forms of amenorrhea (see p. 143).

Secondary amenorrhea due to constitutional causes must be treated by attention to the particular cause in each individual case, when the relief of the underlying condition will almost certainly be followed by the re-establishment of the menstrual function.

In chlorosis the great indications for treatment, as Herman has said (*loc. cit.*), are fresh air, light, food, iron, and laxatives, to which might be added another item of great importance—intervals of rest. It is a matter of common observation that chlorosis is most prevalent in unhealthy surroundings; indeed, there seems much to favor the theory of Virchow and Stephenson that the disease depends upon a constitutional predisposition, engendered by damp, darkness, unhealthy food, and general want of hygiene. Sunlight and fresh air form an essential part of the treatment. The character of the food must be nutritious, and as Stanley has pointed out (*Birmingham Med. Rev.*, 1906, vol. 59, n. s., p. 102) the diet should contain a large proportion of such foods and vegetables as yield a considerable amount of minerals, especially iron. As Stanley remarks, the diet of working girls, among whom chlorosis is most prevalent, sometimes consists largely of meat and is always particularly deficient in the class of foods just mentioned. Milk, eggs, and any nutritious easily digested foods are suitable, and it must be remembered that when the appetite is poor and capricious, as it is in all forms of anemia, especially chlorosis, any article of food not absolutely injurious will be of service, if the patient has a fancy for it.

Of all remedies employed in the treatment of chlorosis, iron has always held the first place, although exactly how it works is not known. Carbonate of iron in the shape of Blaud's pills, is the preparation considered most efficacious by authorities in general. The formula is:

℞ Ferri sulph., } āā . . . . gr. ij
Potassi carb., }
Mucil. trag., q. s.
M. et ft. pil. j. Mitte tales 100.

It is best to begin with one pill three times daily, after each meal, and increase the dose gradually up to three. Hayem recommends the oxylate of iron, as less irritating to the stomach than the carbonate, in pill form, in doses of one to five grains. The tincture of the chloride of iron also gives excellent results, in doses of two to thirty drops, well diluted with water; an old well-seasoned preparation should be used. Reduced iron is another useful preparation, in pill form, the dose varying from one to five grains after each meal. Herman (*loc. cit.*) recommends the ammonio-citrate of iron combined with an alkali carbonate and made up with spirits of chloroform to make it palatable. The following formula is effective:

℞ Ferri et ammon. cit. . . . . ʒj
Potassi carb. . . . . gr. xxiv
Spts. chlorof. . . . . fʒj
Aq. dest., q. s. ad. . . . . f℥vj
M. S. One dessert-spoonful after each meal.

When the stomach is too irritable, as it sometimes is, to allow of iron being given by the mouth, it must be administered hypodermically. Dori, cited by Pratt (*N. Y. Med. Times*, 1905, vol. 33, p. 77), considers the ammonio-citrate of iron best for hypodermic use. He finds that patients are able to tolerate large doses of iron given in this way when the administration by mouth is out of the question. The daily dose is three centigrams (about one-half of a grain) dissolved in a gramme of water (about half a teaspoonful) injected into the interscapular region.

Next to iron, arsenic gives the best results in the treatment of chlorosis. It may be given as Fowler's solution (liquor potassi arsenitis), dose two to five drops three times a day; or as a pill in the form of arsenious acid, dose one-thirtieth to one-fiftieth of a grain. In some cases it is best to give arsenic hypodermically, and for that purpose I have found a French preparation, the *cacodylate de soude*, give excellent results.

Manganese, so highly recommended in the treatment of all forms of amenorrhea, is considered by Stengel to be useless in chlorosis. If it is tried it should be in the form of the dioxide, dose two to five grains in pill three times a day. A good prescription in which arsenic and manganese are combined with iron is the following:

℞ Ferri sulph.	gr. ij
Acidi arsen.	gr. $\frac{1}{40}$
Mangani diox.	gr. iij
Mucil. trag., q. s.	

M. et ft. pil. j. Mitte tales 100.
S. One pill three times a day.

A course of chalybeate or arseniate waters is sometimes useful.

Forchheimer finds the best results in the treatment of chlorosis by combining an intestinal antiseptic with a blood preparation. He gives five grains of hydronaphtol and salol before each meal and five grains of hemogallol after it. If the latter preparation cannot be obtained, large quantities of beef juice may be substituted, or any preparation which contains blood, care being taken to make sure that it really measures up to its claims. It is certain, according to Pratt (*loc. cit.*) that in some cases of chlorosis antiseptics succeed where iron fails. The success of this plan of treatment seems to agree with Clark's theory that chlorosis is caused by the absorption of poisonous products, ptomaines, etc., from the large intestine.

The constipation, which almost always accompanies chlorosis, requires constant attention. Salines are the best form of laxative, and if anything stronger is required to start the bowels, calomel may be administered in broken doses of one-eighth to one-sixth of a grain, at intervals of half an hour, until one grain has been taken. The following prescription recommended by Hart and Barbour is excellent even if somewhat bitter:

℞ Magnesii sulph.	℥j
Quin. sulph.	gr. xxiv
Acidi sulph. dil.	fʒiij
Aq. dest., q. s. ad.	f℥vj

M. S. One tablespoonful three times daily.

The bitter is really a valuable adjuvant to the purge.

Gastric symptoms must be met according to the indications. When there is an excess of hydrochloric acid, large quantities of an alkali may be given before meals. In some cases, where the glands of the stomach are atrophied, Pratt (*loc. cit.*) recommends stimulating the small intestine by the administration of the ferment of the pancreas or by papain. The dose of pancreatin is five to fifteen grains in powders, while that of papain is two to five grains in the same form.

Vomiting, according to Stengel (*loc. cit.*) is best treated by minute doses of calomel combined with a local sedative, such as cocain, one-fortieth to one-twentieth of a grain; dilute hydrocyanic acid, one to two drops; creosote, one-quarter to one-half drop; or carbolic acid, one grain. An excellent prescription for this purpose is the following:

℞ Hydrarg. chlor. mit. .... gr. j
Acidi carbol. .... gr. vj
Bismuthi sub-nit., q. s.
M. et ft. pil. no. viii.
S. One pill every hour until relieved.

Nervous symptoms, when they are present, must be treated according to the indications. In cases combined with chorea, which are not infrequent, arsenic is the best remedy. For the severe headache which sometimes accompanies chlorosis, the various coal-tar preparations may be tried, or the bromides.

Finally, one most important remedy in chlorosis is rest. Hayem insists strongly upon this point, as well as Taylor, cited by Pratt (*loc. cit.*), who says that the classical treatment of chlorosis with iron and purgatives is not assisted, but rather counteracted by the accompanying prescription of exercise. "Against fresh air," he says, "I have nothing to say, as long as it does not involve exercise either by walking or riding. It is, of course, partly a question of proportion; the worse the case, the more absolute should be the rest. In a slighter degree of anemia, or in one already recovering, carriage exercise may be allowed, while in the severer forms the patient may with advantage be kept in bed entirely, the most certain means of keeping her absolutely at rest. An intermediate prescription is that the patient shall only get up for three or four hours in the afternoon."

Edgecombe has shown that under normal conditions there is a fall in the percentage of hemaglobin during the day with a rise at night. Moreover, the daily diminution is increased by exercise. His observations were made upon healthy persons, but they are significant of what rest may do in building up hemaglobin. Hayem has shown that when chlorotic patients are allowed to walk about, the blood pigment present in the urine is greatly increased over the amount present during rest. It is safe to say that the routine prescription of fresh air and exercise in chlorosis is one which should be modified. Fresh air is important, but active exercise should be proscribed. In well-marked cases absolute rest in bed should be prescribed until there is a decided increase in the percentage of hemoglobin. After this point is reached, the patient should have passive exercise in the open air, with massage. In milder cases it is enough to insist upon rest in the recumbent position for several hours every day, and the absence of active exercise. In the treatment of chlorosis it must always be remembered that relapses are frequent, and therefore the treatment should always be kept up for some time after the patient is apparently restored to health.

In amenorrhea occurring during the course of tuberculosis, attention should be directed to the tubercular affection. Should the primary condition be arrested and the general health restored, menstruation will return, while if the disease progresses, the absence of the menstrual flow should be regarded as a benefit.

The amenorrhea which accompanies or follows severe illnesses should also be looked upon as a blessing, since the absence of the menstrual flow is nature's effort to conserve strength. No treatment is necessary beyond attention to the general health, and the patient and her relatives can be assured that with the return of health the function will almost certainly be re-established.

A functional amenorrhea, as a rule, requires no treatment. In cases where it arises from shock, alarm, or nervous disturbance, the physician can only counsel patience until the nervous system has had sufficient time to recover. In cases where there is a sudden stoppage of menstruation from exposure to cold, the treatment should be calculated to restore the circulation to its normal rhythm, for the causes at work probably act mainly through the vaso-motor system. The patient should have a hot tub or hip bath and be put to bed, warmly covered up, with hot-water bottles, and a hot poultice over the hypogastrium. I have myself cured one case of over a year's standing by feeding large amounts of the fresh corpus luteum. The patient sometimes suffers from attacks of headache, dizziness, and flushes, recurring at intervals corresponding generally to the expected menstrual periods. In such cases as these the discomfort can often be relieved by scarifying the cervix until a few ounces of blood have been removed. W. L. Burrage has successfully treated cases of this kind by the application of leeches to the cervix.

Emmenagogues.—I do not myself recommend the class of medicines known as emmenagogues. Their action is extremely uncertain, and should menstruation appear while one of them is in course of administration, its appearance is probably due to causes apart from the drug. In amenorrhea due to unsuspected pregnancy, the use of emmenagogues has been followed by most disastrous consequences. The principal remedies falling under this head are:

Manganese.—This is best given in the form of dioxide, two to five grains three times daily in the form of a pill. The permanganate of potash may be substituted, dose one-half to one grain three times a day, also in pill.

Apiol (Garden parsley).—The dose of this remedy is three to six minims, administered in capsules, after each meal. The administration should be begun several days before the flow is expected.

Aloes.—This should also be begun several days before menstruation is due, in the form of purified aloes, dose one grain; or aloin, one-half of a grain, both in pill form three times daily.

There is one other variety of amenorrhea which cannot be included under any of the classes just discussed, and that is the amenorrhea due to the superinvolution following severe labor. It is fortunately rare, but it must always be borne in mind whenever a persistent amenorrhea is noted after labor. Nothing can be done to relieve it.

VICARIOUS MENSTRUATION.

Vicarious menstruation is a term used to describe a condition in which in the absence of the regular menstrual flow a substitutive hemorrhage occurs from some other part of the body. There is some disagreement among the members of our profession as to whether a vicarious menstruation really exists, some persons contending that the cases reported will not bear analysis (Wilks, *Brit. Gyn. Jour.*, 1886–7, vol. 2, p. 177); others maintaining that there is a sufficient number of authentic cases to establish the reality of its existence (R. Barnes, *ibid.*, p. 151).

As Withrow has pointed out (*Amer. Jour. Obst.*, 1892, vol. 25, p. 164), this disagreement arises partly from a lack of exactness as to definition. Menstruation has been usually defined as a periodical discharge of blood and endometrial débris from the uterus, and if the presence of endometrial débris is considered essential to the definition, a discharge from any other organ than the uterus cannot constitute menstruation, therefore under such a definition vicarious menstruation does not exist. It has been suggested as more appropriate that the term vicarious hemorrhage should be substituted for vicarious menstruation.

The term, as used here, is intended to signify a discharge of blood taking place from an organ other than the uterus, at intervals corresponding in a general way to those existing between the menstrual periods, menstruation being at the same time wholly or partially suppressed. Under this definition, vicarious menstruation is of two different kinds: one in which the regular menstrual flow takes place as usual and is accompanied by hemorrhage from some other organ (supplemental); another in which the menstrual flow is absent and its place is taken by hemorrhage elsewhere (substitutional).

The nose is the most frequent situation for vicarious hemorrhage, but there is hardly a mucous surface in the body from which it has not been observed to take place: the stomach, the intestinal tract, the lungs, the bladder, the vagina, the eye, the ear, the tonsils, and the gums have each in turn been reported as the seat of the flow, as well as the nipples and the umbilicus. It has also been observed to take place from the surface of old cicatrices, and, in a few rare instances, from the skin, representing, it may be, the "bloody sweat" long classified among medical curiosities. One special form of vicarious hemorrhage is the discharge of blood from the bowel which sometimes takes place at long intervals after operations for the removal of the sexual organs, and represents the absent menstrual periods. A discharge of this kind rarely continues after a few months.

The efficient underlying cause of vicarious menstruation is not yet understood. It is manifestly a part of the ovarian function, probably of the corpus luteum in process of formation, to stimulate a vasomotor congestion, which in some cases is general, as shown by the throbbing full feeling in the head accompanied by pain before the appearance of the menstrual flow; and when the blood is once discharged the tension elsewhere is reduced. We do not know, however, by what cause this local congestion followed by discharge of blood from the uterus is determined. If the possibility of relief through the natural channels is taken away, the efferent impulse is diverted and concentrates itself upon the spot in the body at which the vessels can be most readily dilated and ruptured. The impulse instead of being reflected from the ovaries back to the uterus is reflected to whatever vascular area responds most readily to it. The reasons for this selective action in a given case, however, are obscure.

Withrow (*loc. cit.*) mentions an interesting instance of heredity in connection with vicarious hemorrhage, in which there were two sisters, neither of whom had ever menstruated, although their genital organs were normal. One of them never showed any signs of menstruation, but the other had attacks of epistaxis occurring at intervals which corresponded in a general way to what should have been menstrual periods. The attacks began at puberty and continued up to the age of forty-one. A niece of these women, the daughter of an older sister, resembled them in never menstruating, her pelvic organs, like theirs, being normal. She also had attacks of epistaxis at intervals of about four weeks for a number of years, the bleeding taking place always at night. All of the women were married and all remained sterile.

The treatment of vicarious menstruation must depend upon the nature of the case. The causes of the accompanying amenorrhea must first be ascertained and, if possible, removed, for when menstruation is re-established, the vicarious hemorrhage will, in all probability, cease. Seeligman (*Centrbl. f. Gyn.*, 1893, vol. 17, p. 642) advises the use of a hot douche during the time supposed to correspond to the intermenstrual periods, for the purpose of inducing the menstrual flow. In cases where normal menstruation cannot occur, the vicarious hemorrhage is often a safety-valve which it is not well to shut down. If the relief from the vicarious hemorrhage is not sufficient to relieve the headache, flushing, and dizziness it is sometimes a good plan to scarify and deplete the cervix. In rare cases the vicarious hemorrhage is so profuse as to require measures for its control. Under these circumstances the usual remedies for checking hemorrhage should be tried, adapting them to the situation from which the hemorrhage proceeds. The application of ice is of service, and where the hemorrhage is from the stomach Küstner recommends gastric lavage with iced water.

In exceptional instances radical measures are indicated. Webster (" Text-book of Diseases of Women," 1907, p. 114) mentions two cases of vicarious hemorrhage under his care in which he was obliged to remove the ovaries (in both instances diseased) because life was endangered by the repeated hemorrhages. He does not state the situation of the vicarious hemorrhage. Fischel (*Prag. med. Wochenschr.,* 1894, No. 12) has been obliged to resort to the same radical measure in a case of rudimentary uterus accompanied by vicarious menstruation in the form of hematemesis.

CHAPTER VII.

MENORRHAGIA AND METRORRHAGIA. EXTRA-UTERINE PREGNANCY.

(1) Definition, p. 149.
(2) Classification of forms of uterine hemorrhage, p. 150.
(3) Symptoms and Diagnosis. (*a*) Local causes—Abortion, p. 151; polypi, p. 152; submucous myomata, p. 154; carcinoma of the cervix, p. 155; carcinoma of the fundus, p. 156; sarcoma, p. 156; chorio-epithelioma, p. 157; retrodisplacements, p. 158; subinvolution of uterus, p. 158; inversion of uterus, p. 159; acute endometritis, p. 160; chronic endometritis, p. 160; hypertrophy of the endometrium, p. 161; polypoid endometritis, p. 161; tuberculosis of the endometrium, p. 162; cystic ovaries, p. 162; pelvic hematocele, p. 163; corpus luteum cysts, p. 163; inflammation of the tubes and ovaries, p. 163; extra-uterine pregnancy, p. 163; sclerosis of uterine blood vessels, p. 163; calcification of uterine blood vessels, p. 164; (*b*) Constitutional and vascular causes, p. 165.
(4) Diagnosis of uterine hemorrhage in general, p. 166.
(5) Treatment. General considerations, p. 169. Medicinal measures, p. 170. Mechanical measures, p. 173. Surgical measures, p. 174. Constitutional measures, p. 179.
(6) Extra-uterine pregnancy. History, p. 180. Etiology, p. 181. Diagnosis, p. 185. Treatment, p. 187.

Definition.—Uterine hemorrhage is of two kinds: one, which is periodical, that is to say, associated with the normal menstrual flow, is for this reason called menorrhagia (monthly bleeding); the other, occurring at irregular intervals and standing in no manifest relation to menstruation, is known as metrorrhagia (simply uterine bleeding). In some cases it is easy to use these two terms with discrimination, while in others it is impossible, because the conditions co-exist. Precisely the same causes often give rise to menorrhagia and to metrorrhagia, as, for example, incomplete abortion, cancer of the cervix or of the body of the uterus, fibroid tumors, and extra-uterine pregnancy. It is plain, therefore, that it is not always possible to be minutely particular in the classification of any particular case under one or the other category, and that the terms are simply used as a matter of general convenience.

There is no difficulty in recognizing a case of uncomplicated metrorrhagia, for any uterine hemorrhage occurring at times other than the regular menstrual periods comes under this head. The recognition of a menorrhagia is more difficult, for the question whether the menstrual flow is, or is not excessive must be, within certain limits, a personal one. The normal habitual discharge of a plethoric woman would be a serious loss to another of slight build, with but little blood to spare. Each woman soon learns her individual norm which she can comfortably bear, and realizes that if it is greatly exceeded for several periods her general health begins to suffer. The common method of estimating the amount of blood lost by the number of pieces of protective gauze or "napkins" used is a fairly reliable way of gauging an increase, but it is not a reliable guide as to the absolute amount. In general terms, it may be said that menorrhagia exists when two to three times the usual amount of blood is lost, coming away in spurts or gushes of bright red color or accumulating in clots in the vagina, to be discharged at intervals. The amount of blood lost may be so great as to exhaust the patient greatly and even endanger life and it is always an important point in the physician's duty to decide whether the loss is sufficient to impair the health. A notable characteristic of menorrhagia is the fact that the flow is greater when the patient is on her feet and moving actively about.

Typical menorrhagia, then, is characterized by an excessive flow at the menstrual period. There are two different types of the condition which may exist separately or conjointly: a flow which is excessive throughout the period, and one which is unduly prolonged beyond its normal limits. A persistent menorrhagia of either type reacts upon the patient's health, inducing anemia, shortness of breath, and general debility.

FORMS AND CAUSES OF MENORRHAGIA AND METRORRHAGIA.

The causes of uterine hemorrhage belong under three classes: Local, constitutional, and vascular.

Local causes, due to conditions present within the pelvis, are the following:

Abortion,
Polypi,
Submucous myomata,
Carcinoma of the cervix,
Carcinoma of the fundus,
Sarcoma,
Chorio-epithelioma,
Retrodisplacements of the uterus,
Subinvolution of the uterus,
Inversion of the uterus,
Acute endometritis,
Chronic endometritis,
Hypertrophy of the endometrium,
Polypoid endometritis,
Tuberculosis of the endometrium,
Cystic ovaries,
Pelvic hematocele,
Corpus luteum cysts,
Inflammation of the tubes and ovaries,
Extra-uterine pregnancy,
Sclerosis or atheroma of the uterine blood vessels,
Calcification of the uterine blood vessels.

Constitutional Causes:

Anemia, especially pernicious anemia,
Rheumatic diathesis,
Scurvy,
Phthisis,
Infectious diseases.

Vascular Causes: The causes lying in the vascular system are notably:

Cardiac disease with a vascular stasis, especially mitral regurgitation.
Hepatic disease with a portal stasis, as in cirrhosis.

SYMPTOMS AND DIAGNOSIS.

LOCAL CAUSES.

Abortion.—In married women threatened or incomplete abortion must always be suspected as the cause of a menorrhagia until its existence is disproved; only in this way will mortifying mistakes be avoided.

Threatened Abortion.—The symptoms indicating a threatened abortion are, pains due to uterine contraction and loss of blood. Loss of blood, no matter how slight, in the early months of pregnancy should always be regarded with anxiety, for if it does not proceed from an impending miscarriage, it must be due either to an endometritis or, in the later months, to an abnormal placental implantation. When due to threatened abortion the discharge is not usually profuse at first; it may be of a dirty brown or a brownish red color, or it may consist of fresh red blood and coagula. This premonitory bleeding may hang on for weeks, or it may be shortly followed by the complete expulsion of the ovum, when it ceases. The diagnosis of threatened abortion must be made from the history of a missed period and the presence of some uterine enlargement, on account of which the patient herself thinks she is pregnant. In many cases an abortion has occurred before in a similar manner.

Incomplete Abortion.—The symptoms of incomplete abortion are a complex of pain, hemorrhage, and, it may be, the expulsion of membranes. One characteristic of the hemorrhage often present, is that it comes in spurts or gushes and keeps up with slight intermissions until the miscarriage is complete. It sometimes happens, however, that the abortion has occurred so early that no suspicion of pregnancy has arisen, and a curettage undertaken for the relief of the hemorrhage reveals its true cause. In a recent case of this kind in my own practice the patient complained of irregular menstruation, sometimes profuse and sometimes scanty. For about three months before I saw her the flow had been excessive and had lasted from six to seven days. Her family physician ascribed it to a polyp, seen hanging to the uterus. On curetting I removed a large amount of endometrial débris which macroscopically resembled carcinoma; microscopical examination, however, showed syncytium and villi, the remains of an incomplete abortion. Yet there had been no suspicion of pregnancy.

In doubtful cases the diagnosis of incomplete abortion must always rest upon the microscopical examination of curettings from the endometrium. The most characteristic appearance in the often abundant tissue removed is little villous threads and dark coagula interspersed through the fleshy masses. Histologically, a glandular hypertrophy may predominate, in which the glands are dilated and convoluted, with little tit-like processes springing from their lumina; the epithelium is somewhat flattened and the stroma of the mucosa shows marked swelling of the cells, which persists for several weeks after the abortion. While these appearances are suggestive of pregnancy, a positive diagnosis must rest upon the discovery of villi. In the early months these will be found to show two layers of epithelial covering, the interior of which is made up of cuboidal cells, while the outer, syncytial layer, appears as a ribbon of protoplasm with nuclei distributed through it; this outer layer sends out protoplasmic buds which form new villi and in the centre of these buds are five to forty nuclei forming the placental giant cell. The interior of a villus is composed of mucoid tissue rich in blood vessels.

A Placental Polyp.—A placental polyp (see Fig. 60) is one in which, after the expulsion of the fetus, the long retained fetal elements and blood become welded together and moulded into conformity with the uterine cavity. The placenta, still preserving its attachment to the uterine wall, becomes coated with layers of old coagula until it hangs down into and out of the cervix, a rounded, pedunculate, polypoid mass.

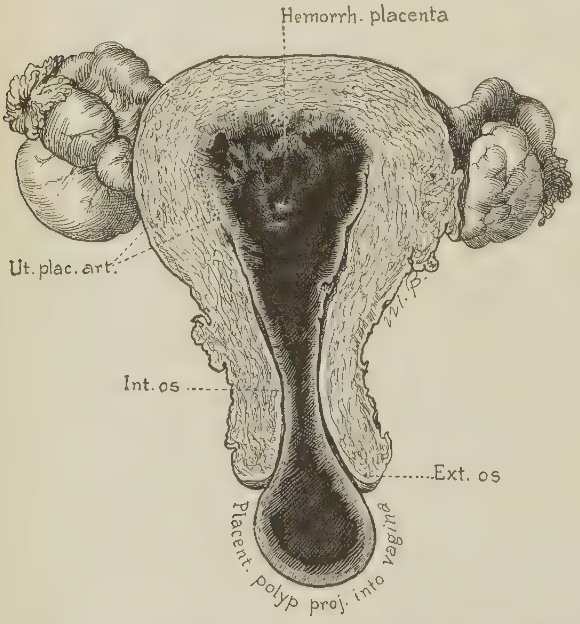

FIG. 60.—A PLACENTAL POLYP, THE PRODUCT OF AN INCOMPLETE ABORTION, FORMED BY THE CONTRACTIONS OF THE UTERUS ACTING ON HEMORRHAGE TAKING PLACE SLOWLY AT THE PLACENTAL SITE. (After Bumm.)

Mucous Polyp.—A mucous polyp is a soft growth, produced by a localized hypertrophy of the uterine mucosa, which becomes pedunculate. It is frequently associated with endometritis and with fibroid tumors. Its size varies from that of a pea to a walnut and occasionally it is larger. Cervical polypi (see Fig. 61) are most frequently pedunculate and protrude from the external os, while those within the uterine cavity are often found near the tubal ostia. The one prominent symptom in uterine polypi is hemorrhage, which is sometimes severe. The diagnosis is easily made when the polyp can be seen hanging into the vagina or just within the os uteri, where it looks like a smooth, round, fleshy ball. Sometimes a number of little red polypi depend from the cervix. A microscopical examination shows mucous membrane with uterine glands; the glands are mostly normal, but when they are dilated and form small cysts, the epithelium becomes cuboidal and the cavities contain desquamative epithelial cells. The stroma, especially near the tip of the polyp, often shows hemorrhage and edema. When no polyp can be seen, the diagnosis may be extremely difficult and sometimes can be made only by exclusion; that is to say, no other probable cause being found for a protracted hemorrhage at every period, persisting for months, and associated with the fact that the uterus is not markedly enlarged, warrants the assumption that the trouble is due either to a polyp or a small submucous fibroid tumor. Occasionally, a polyp can be removed with the curette, but, as a rule, an incision into the uterus is necessary to discover and remove it. Small sessile fibroid growths should be treated in the same manner.

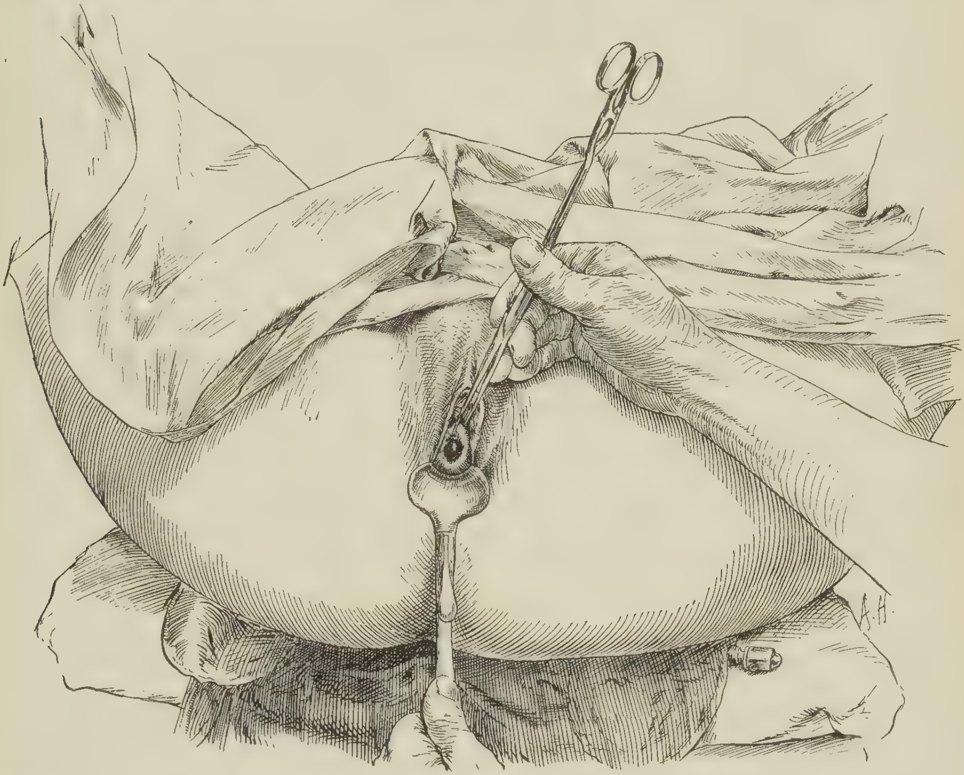

Fig. 61.—A Cervical Polyp, Appearing as a Dark Red Mulberry Mass Just Within the Cervix, and Causing Hemorrhage.

Submucous Myomata.—Most myomata are interstitial in the beginning, but it often happens that a tumor, beginning in this manner, is carried down in the course of its development into the uterine cavity where it is attached either by a broad base or a pedicle of varying length (see Fig. 62). The two characteristic symptoms of submucous myomata are hemorrhage and pain. The hemorrhage is often excessive and reduces the patient's strength to the last degree. The pain arises from the expulsive efforts of the uterus to push the foreign body without the cervix, and is severe, intermittent, and expulsive in character like that of labor. Cases sometimes occur in which the pain is slight and the chief symptom is hemorrhage. It also happens occasionally that a thin serous oozing from the tumor is a marked symptom. Direct examination shows a rounded tumor in the vagina or just inside the cervix. By passing a finger around it on all sides the tumor will be found to be smooth and to have a pedicle within the uterus. If the growth is still retained inside the uterus, the pedicle may be demonstrated by passing a sound around it on all sides. A myoma within the uterus has the characteristic feel of a ball in a cup and it may sometimes be rotated so as to show that it has a narrow pedicle above. A myoma sessile within the uterus may sometimes be diagnosed without difficulty by introducing the index finger through the cervix, the other hand being used to make counter pressure through the abdominal wall. When the canal is too small to admit the finger, a sound may be employed instead. By noting the increased depth of the uterine cavity and tracing its irregularities by the sound moving within it and by palpation per rectum and per abdomen at the same time, an accurate idea may be obtained of the size and location of the tumor. Such a fibroid tumor is always larger than a mucous polyp.

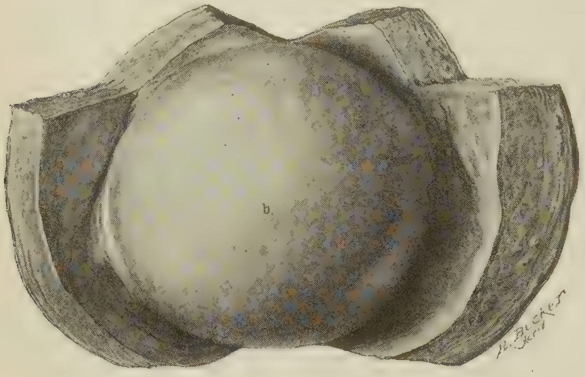

FIG. 62.—A LARGE SUBMUCOUS MYOMA (*b*), SOLITARY AND FILLING THE UTERINE CAVITY. The uterus has been split from the cervix (*a*) up to the fundus and out into each cornu.

To differentiate between a myoma and a uterus which is inverted, either wholly or in part, the peritoneal surface of the uterus must be palpated by the rectum when, if there is any inversion, the corresponding depression on the peritoneal surface will be felt. Furthermore, in inversion the neck of the tumor stops short inside the cervix on all sides.

A submucous myoma is sometimes mistaken for cancer of the cervix, which is not surprising; because when the patient suffers for a long time from profuse hemorrhage she acquires a cachectic look resembling that of cancer, and, moreover, when there is a sloughing myoma it gives rise to frequent fetid discharges. The distinction must be made by observing the location of the tumor and its density as contrasted with the friability of cancer. The smaller myomata are quite smooth on the surface while the larger are nodulated. The myoma presents a distinct, well-rounded tumor, contracted above a pedicle which enters a canal; the cancer, on the other hand, is a tumor with a broad attachment to the cervix, not within the uterus, and often only to one point. The diagnosis between a small submucous myoma within the body of the uterus, which cannot be felt, and a cancer of the fundus may be difficult, but if the endometrium is curetted and the curettings examined microscopically, the characteristic changes will always be found, if the growth is cancerous (see Chap. XXI, p. 503). As a rule, these submucous and pedunculate myomata are not single, but form part of a group of tumors occupying the body of the uterus. This greatly simplifies the diagnosis, as the enlarged multinodular uterus is early recognized as myomatous, the presumptive inference being that the particular growth which is giving rise to the hemorrhage is of the same nature.

Carcinoma of the Cervix.—From the age of thirty, cancer of the cervix must always be considered in the diagnosis of uterine hemorrhage. The frequency with which the disease occurs and the rapidity of its advance make it important to recognize it at the earliest possible moment, as every week of delay in radical treatment (extirpation) of a uterine cancer is precious time lost. It is in this class of cases that the policy of delay can too often be justly laid at the door of the general practitioner by his fellow specialist as a fault which makes him responsible year by year for the loss of many lives. It is of vital importance that the general practitioner should recognize the fact that anemia and cachexia are only present in the last stages of the disease and that pain does not usually appear until it has progressed beyond the cervix. An operation, to be successful, must be performed before the appearance of these signs, and, as a rule, it is the general practitioner who sees the case while there is still time to save life.

Cancer of the cervix is extremely rare in women who have not borne children. Menstruation is usually regular up to the time the cancer begins and may or may not be affected by it. The symptoms of carcinoma, whether of the body or of the cervix, are hemorrhage, watery, foul discharges, pain, emaciation, and cachexia. Watery discharges and hemorrhage are the earliest and most marked symptoms, although the latter may be absent altogether. The hemorrhages occur at other times than the regular periods and vary in frequency, occurring at intervals of a few weeks to several months. A watery discharge is often an earlier symptom than the hemorrhage; it may irritate the external genitalia and, as the disease advances, it becomes purulent and malodorous. Pain is not, as a rule, present until the disease has advanced beyond the cervix; some patients, however, complain of cramp-like pain of the uterus or of frequent backache in the early stages. As the disease progresses, the growth presses upon the nerve trunks, and the pain is no longer limited to the pelvis, but extends to the thighs, knees, and down the legs. In the early stages and often up to a late period, the patient looks well, keeps her usual weight, and is not at all anemic; in all but a few cases, however, the later stages are accompanied by great emaciation, anemia, and that peculiar unhealthy pallor of the skin characteristic of malignant disease.

A vaginal examination in the early stages of cervical carcinoma shows the cervix to be slightly enlarged, firm, and glazed in appearance, while a few fine finger-like processes may project from the surface. The examining finger is often covered with blood when withdrawn. In more advanced cases the upper part of the vagina is filled with a friable cauliflower-like growth, which breaks down on touch. On tracing this upward it will be found to spring, as a rule, from one of the cervical lips. It is at this stage of the disease, while it is still limited to the cervix, that the diagnosis is a matter of such vital importance, for the results of operation performed during this period, reported during the last few years, are most encouraging, and seem to indicate plainly that ultimate recovery may be looked for in a good many cases, if operative interference is not delayed. As cervical cancer progresses, the growth breaks down; the cervical lips are enlarged and present a ragged uneven surface extending over a more or less extensive area at the vaginal vault. The floor of the eaten-out area is very hard, but small pieces break off under a little pressure made by the finger. In later stages all traces of the cervix disappear and the vaginal vault is occupied by a small, puckered, ulcerated, hard, nodular area covered by a necrotic brown or greenish slough.

Carcinoma of the Fundus.—Cancer of the body of the uterus is a disease of women over forty and usually over forty-five. The uterus is commonly enlarged, although not always, and the cervix is hardly ever involved. The hemorrhage is here painless and persistent, lasting ten days or longer, and the discharge is apt to be dark and often watery as well. It is odorous only in the later stages. An atypical flow, coming on in a woman who has passed the menopause and whose uterus is not markedly enlarged or nodular, as in a fibroid uterus, ought always to arouse more than a suspicion of cancer of the body. The early diagnosis of cancer of the fundus must depend entirely upon the microscopical examination of the scrapings from the endometrium. Whenever there is the slightest reason to suspect the existence of the disease, the uterus must be curetted without loss of time and the curettings carefully examined (see Chap. XXI, p. 503).

I would repeat that in the early stages of either form of uterine carcinoma, a positive diagnosis can be made only from a microscopical examination of the curettings from the uterine lining.

Sarcoma.—Sarcoma of the uterus, like carcinoma, may occur at either the cervix or the fundus. The symptoms are much the same as those observed in carcinoma; namely, hemorrhage, watery, foul discharges, and pain, together with more or less cachexia in appearance. Examination of the scrapings from the endometrium will show the characteristic appearance of sarcoma if it is present. There is a peculiar form of cervical sarcoma known as botryoidal, or grape-like, in which the vagina is filled with masses of vesicular bodies, made up of rapidly growing nodules, each with its own little vesicular pedicle. Only a few cases of this disease have been reported; I have myself seen but one, many years ago, in which, not recognizing the condition, I amputated the mass at the cervix. The operation was followed by a rapid recurrence and the invasion of all the surrounding tissues. Another form of sarcoma appears as deep-red or bluish masses involving the vagina as well as the cervix, which once seen can never be forgotten.

Chorio-epithelioma.—Chorio-epithelioma or deciduoma malignum, is a new growth developing after a normal pregnancy, an abortion, or the expulsion of a hydatidiform mole. It has sometimes been known to occur before the mole was expelled. Whenever a patient gives a history of menorrhagia following recovery from a labor, a miscarriage, or especially the expulsion of a mole, and examination shows that the uterus is enlarged, the presence of chorio-epithelioma must be suspected. The diagnosis can be made with certainty only by examination of the curettings from the endometrium, and it must be remembered that in curettage for chorio-epithelioma it is easy to get a piece of the uterine wall which will suggest a fibroid tumor. Histologically, the tumor is composed of blood spaces surrounded by the elements of the growth, derived from both layers of the fetal ectoderm and presenting in an exaggerated manner the peculiar characteristics of these cell elements. The syncytial masses present are multinuclear, with dark staining nuclei and numerous vacuoles. The elements from the Langerhans' layer are large cells with clear protoplasm and vesical nuclei in which karyokinetic figures are frequently visible. These are especially perceptible about the margins of the growth and invade the surrounding muscular tissue. The first evidence of growth may be found in metastases into the vaginal walls or into other organs, and in some instances the entire growth disappears. It is not always easy, however, to distinguish chorio-epithelioma from a benign hydatidiform mole by means of the curettings, and all the clinical facts must be weighed, together with the histological findings, in order to differentiate between the two conditions. Profuse uterine hemorrhage beginning a few weeks (six on an average) after the termination of pregnancy and leading to profound anemia is strongly suggestive of deciduoma. In some instances the interval of development has been as much as a year after the previous pregnancy; where a still longer time has elapsed, the question must be considered whether a pregnancy has not occurred of which the patient was ignorant. A fetid, watery discharge is sometimes present; pain has been noted in some cases, but is not a prominent symptom. In many instances marked irregular fever has been observed, which, in a case under my notice, was unassociated with leucocytosis. The uterus is usually enlarged to the size of about a three months' pregnancy.

Retro-displacements.—Backward displacements of the uterus are frequently accompanied by menorrhagia. The symptoms, in addition to the hemorrhage, are, pain in the back, aggravated by exertion and standing; a feeling of weight and bearing down in the pelvis; and leucorrhea. Examination will at once reveal the presence of the displacement, its nature, and its degree.

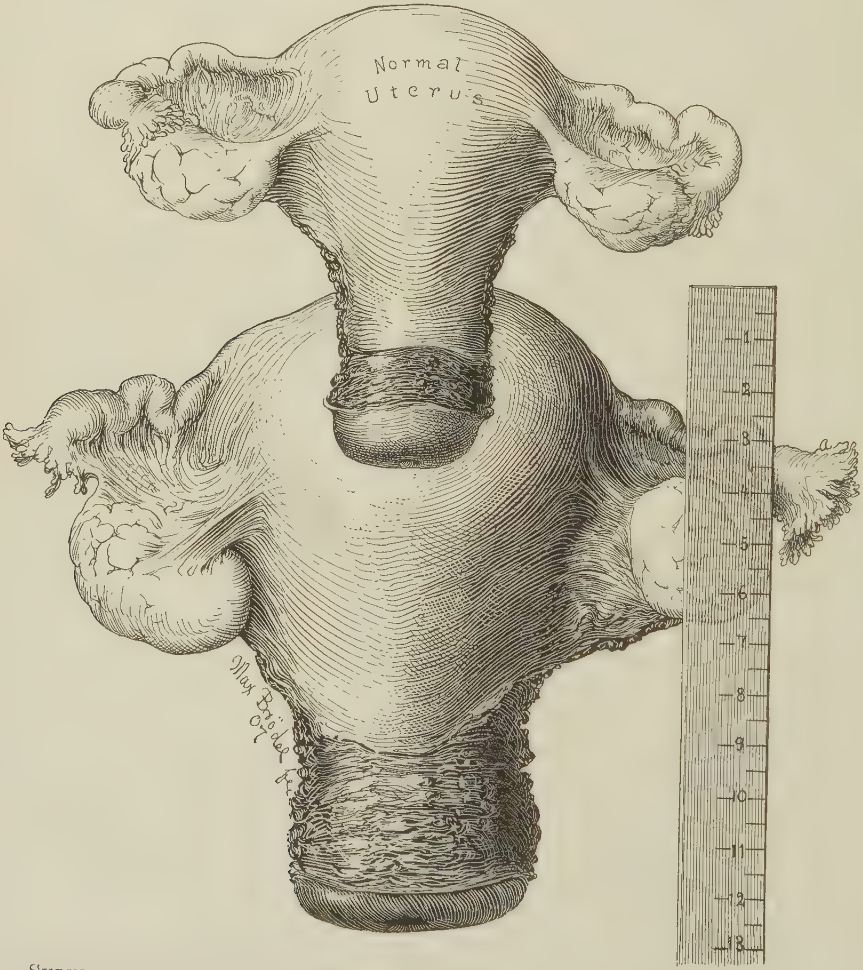

Fig. 63.—Subinvolution of the Uterus, which is 13 cm. Long and Enlarged in the Proportion shown by Comparison with the Normal Uterus Superimposed Above. This patient had for a long time suffered with profuse hemorrhages at the time of the menopause. There was no tumor or malignant disease.

Subinvolution of the Uterus.—This condition arises from the arrest of involution in the uterus which has expelled the products of conception. It may occur after either a miscarriage or a labor at term. After the increase in size of the uterus during the development of the ovum, the organ normally undergoes retrogressive changes by which it is restored to nearly the size which it was before impregnation. But if these retrogressive changes fail to take place, the uterus remains large and boggy, while the endometrium becomes thick and succulent (see Fig. 63). The symptoms of this condition are pain and feeling of weight in the pelvis, with a sense of bearing down. Menorrhagia is always present and frequently leucorrhea. Examination shows the uterus to be enlarged, boggy, and frequently displaced, and these facts, together with the history, which shows that the patient dates her condition from a confinement or a miscarriage, establish the diagnosis.

Inversion of the Uterus.—Inversion of the uterus can occur under two different conditions: (1) Immediately after labor, as the result of it; (2) gradually, in a non-puerperal uterus along with the expulsion of a tumor attached to the uterine wall. The amount of inversion varies from a simple depression at the fundus (*inversio incompleta*) to a complete turning inside out of the organ (*inversio completa*). Any condition which favors relaxation of the musculature of the uterus and a patulous cervix, predisposes to inversion. The exciting cause is usually some direct mechanical pressure exerted from above. There seems good reason for believing that many cases of post-partum inversion are due to violence exercised during labor. In the non-puerperal, or pathological variety, the most common cause is a submucous fibroid attached to the fundus; the uterine cavity below the tumor is relaxed and the expulsive efforts, like those of labor, which accompany fibromata, force the tumor downward, until finally, in extreme cases, it passes through the cervix into the vagina, dragging with it the portion of the uterine wall attached to it. If the tumor is submucous and becomes pedunculate, the peritoneal surface of the uterine wall may undergo no displacement, in which case there will be no inversion. If, on the other hand, the tumor remains sessile, the whole thickness of the uterine walls and peritoneum may follow as it descends, creating an indentation on the peritoneal surface which is at first slight, but gradually becomes more deeply depressed until, with the escape of the uterus into the vagina and out at the vulva, complete inversion is brought about. The tumor causing the inversion need not arise from the fundus; it may be attached to a lateral wall.

The acute form of inversion, which immediately follows labor, does not come within the scope of this work. In the chronic variety the commonest symptom is menorrhagia, or metrorrhagia, or both, since hemorrhage occurs with great ease from the exposed mucosa. If the inversion is the result of labor, the patient will give a history of hemorrhage dating from it and sometimes state that it was particularly severe just after delivery. In the non-puerperal variety there is no such clue, and the inversion may not suggest itself to the physician as the cause of the hemorrhage for which he is consulted, until he makes a bimanual examination. In extreme cases a red, bleeding, pyriform tumor, about three centimetres in diameter below and contracted above, will be found filling the vagina. Bimanual palpation shows a depression entering the tumor on its peritoneal surface, while the fundus is absent from its normal position. When the inversion is complete, the cervix cannot be distinguished at the vaginal vault, which seems continuous with the tumor. If the inversion is incomplete, the cervix remains as an enlarged ring, into which the sound may be pushed for a short distance. The presence of the orifices of the uterine tubes at the lower end of the tumor is also a diagnostic point of considerable importance. The differential diagnosis between inversion and myoma has been given above (see p. 154).

Acute Endometritis.—This is a rare condition, although often mentioned. There are no special symptoms connected with it, and the diagnosis can be made only from examination of the curettings. Histologically, the surface epithelial cells are often swollen to two or three times their natural size, while the adjacent cells may be compressed. There is a tendency to cell proliferation and between the epithelial cells are many polymorpho-nuclear leucocytes and small round cells. The glands in the superficial portions show swollen epithelium, with a tendency towards proliferation, together with a small round-celled and polymorpho-nuclear-celled infiltration. Some of the gland lumina are partially filled with leucocytes. The deeper portions of the glands are often normal. The stroma shows much infiltration superficially, with polymorpho-nuclear leucocytes and small round cells, the infiltration diminishing towards the muscle. The muscle tissue underneath is rarely much altered.

Chronic Endometritis.—This condition is also rare. The prevailing habit of describing all uterine scrapings as examples of endometritis is greatly to be deplored, since it interferes with our getting a satisfactory knowledge as to the real frequency of the affection and tends to encourage unnecessary operating. The so-called fungoid endometritis is not really a pathological entity at all and the name ought to be avoided. Chronic endometritis is oftenest associated with old cases of pyosalpinx and is rarely found in ordinary scrapings. The slight liability of the uterine mucosa to this affection is due to two factors: First, the tendency of pus-containing tubes to close completely at the uterine end, by which one avenue of infection is shut off; second, the form and position of the uterine canal, which are such as to afford good drainage. Chronic endometritis, when present, is characterized by the unevenness of the mucosa, in which the epithelium is stunted, low, cylindrical, or cuboidal. The glands, in some places, are diminished in number and vary in size; some of them being narrow above and distended below. The epithelium of the dilated glands is somewhat flattened. The stroma is denser than it is normally, especially in the superficial portions, the nuclei tend to become spindle-shaped, and there is much round-celled infiltration. There are practically no polymorpho-nuclear leucocytes. The deeper portions of the stroma are often normal and there are no changes in the muscles.

Hypertrophy of the Endometrium.—Hypertrophy of the endometrium, sometimes called chronic hyperplastic endometritis, is generally the result of an over-supply of blood to the uterus. Any condition, therefore, which induces pelvic congestion is likely to be accompanied by an increased growth of the endometrium. The symptoms are, profuse and prolonged menstruation with a shortening of the intermenstrual period. Sometimes there is metrorrhagia, and cases occasionally occur in which there is a continual hemorrhage, the menstrual periods being distinguished by an increase of the flow. Leucorrhea is almost always present, occasionally tinged with blood.

Examination shows a uterus increased in size and weight, frequently softer than normal in the early stages of the affection and hard in the later. There are two different forms of hypertrophy of the endometrium: glandular and interstitial, both of which may exist at the same time. In the glandular form the glands, which are increased in number, are spiral, and the gland spaces are dilated, with an excess of epithelium in their lumena. The surface epithelium of the endometrium is also proliferated, but the single epithelial layer in the glands or on the surface is never duplicated, except in the senile form of the affection. In interstitial hypertrophy there is at first a round-celled infiltration of the inter-glandular connective tissue. The glands themselves are widely separated and compressed. The surface epithelium is sometimes exfoliated and when the condition has become chronic the round cells become spindle-shaped. If the glands are much compressed they may atrophy and disappear. The uterine mucosa becomes a single layer of epithelial cells on the surface of the uterine cavity.

Polypoid Endometritis.—In this form of endometritis, the uterine cavity is choked by a mass of growths resembling multiple polypi, in which the glands are dilated and the blood vessels increased in size and number (see Fig. 64). It is usually seen in quite young women, and is characterized by profuse menstrual hemorrhage, sometimes of the most severe description. The only condition for which it is likely to be mistaken is malignant disease, and the di-

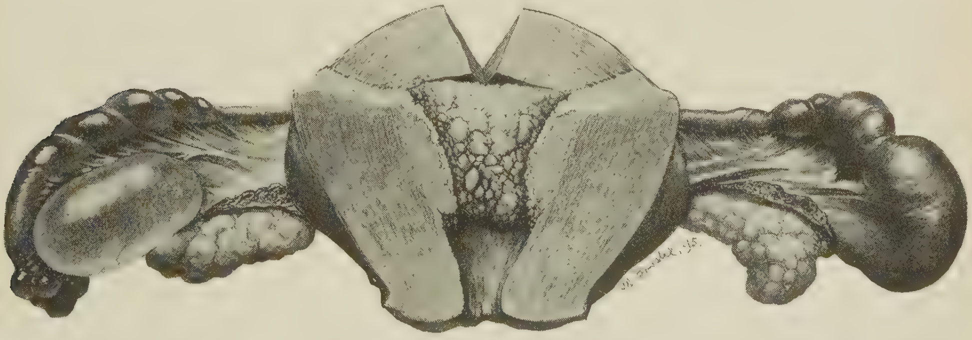

FIG. 64.—POLYPOID ENDOMETRITIS, SHOWING AN EXTENSIVE PAPILLARY OVERGROWTH OF THE UTERINE MUCOSA. (From T. S. Cullen.)

agnosis is easily made from the uterine scrapings, which must always be carefully examined under the microscope (see Chap. XXI, p. 503).

Tuberculosis of the Endometrium.—Menorrhagia is occasionally caused by tuberculosis of the endometrium, which is nearly always secondary to tuberculosis of the tubes. It may be miliary, a part of a general tubercular process, or of the chronic diffuse form. The chronic diffuse form is that with which we usually have to do. It begins, as a rule, at the fundus, being secondary to a tubercular tube. The first visible alterations are little yellowish-white nodules under the surface one to two millimeters in diameter, which may increase in size and numbers and then coalesce and break down, forming an ulcer with an undermined edge. The disease extends from the endometrium into the uterine muscle.

Histological examination in the early stages shows the epithelium of the surface intact and the glands normal, while the tubercles are found scattered throughout the superficial portions of the uterus; these consist of aggregations of epithelial cells, later they are surrounded by small round cells, and at a still later stage, the giant cells are found in the centre. The surface epithelium over the superficial nodule is frequently flattened and plain. In a marked case the glands are encroached upon and it is at times impossible to distinguish some of the epithelial cells from the gland epithelium; in other cases tubercles are seen partly projecting into and obliterating the gland cavity; and again, the gland may be filled with caseous material. In the most advanced cases the cavity is lined by caseous material devoid of nuclei, below which lies a zone of typical tubercular tissue consisting of epithelioid cells and tubercles; in the deeper portions a stray gland may survive where the process has gone deep enough to involve the muscle. The glands are often entirely absent. Bacilli are found with varying frequency, sometimes sparse sometimes abundant, and most numerous in the advanced cases with marked caseation. In my experience, they are much more readily found than in tuberculosis of the tubes. In the early stages of the disease the tubercular process may be entirely unsuspected and the curettings may look like the normal uterine mucosa; but where the disease is advanced, the presence of soft cheesy masses will at once arouse suspicion. Necrotic carcinomatous tissue may present a somewhat similar appearance, but the characteristic branching found in cancer does not occur in tuberculosis. In advanced cases the diagnosis may be reached from the examination of the uterine discharge, which contains tubercle bacilli. It has happened several times in my experience that tuberculosis has been found in a purely accidental way while submitting the uterine scrapings to the routine examination. On other occasions I have found a tubercular endometrium on curetting the uterus immediately after removing the tubercular tubes.

Enlarged Cystic Ovaries.—Menorrhagia arising from enlarged cystic ovaries occurs in youth, or at any rate in women under thirty-five. There may be no symptom but hemorrhage.

Pelvic Hematocele.—Menorrhagia from this cause is usually associated with pelvic inflammatory disease. The symptoms are more or less constant pelvic pain, dysmenorrhea, and hemorrhage. Examination shows the uterus to be full of old viscid blood; it is more or less immobile and may be tender on firm pressure. Irregular lateral masses will be found filling out the pelvis behind the broad ligaments.

Corpus Luteum Cysts.—Menorrhagia is the only symptom arising from this form of cyst. It is impossible to distinguish it from menorrhagia arising from follicular cysts.

Inflammation of the Tubes and Ovaries.—Menorrhagia is a common accompaniment of tubal inflammation. The period is lengthened, the interval shortened, and the quantity of blood lost unnaturally great. In rare instances the menorrhagia becomes a metrorrhagia so profuse and long continued as to cause profound anemia and actually threaten life. In exceptional cases menstruation is scanty or there may be amenorrhea, by reason of atrophic changes in the uterus and appendages. There is usually a history of neurasthenia and digestive disturbances with loss of weight and failing strength. Often there is the history of infection. Examination shows lateral inflammatory masses or else the uterine tubes are large, hard, and distended to a sausage shape.

Extra-uterine Pregnancy.—Menorrhagia is one of the striking symptoms of an extra-uterine pregnancy; but usually something in the history suggests the cause of the hemorrhage. In many cases there will have been the usual symptoms which accompany the early stages of normal pregnancy, namely, cessation of menstruation, morning sickness, fullness of the breasts. The diagnosis of this condition is of such importance that it is considered in a separate section (see p. 180).

Sclerosis or Atheroma of the Uterine Blood Vessels.—The physician sometimes encounters cases in which menorrhagia, or metrorrhagia, or both occur in women nearing middle life, for which none of the causes just discussed can be assigned. Even if the hemorrhage is so severe as to necessitate removal of the uterus to save life, nothing will be found, except that it is somewhat enlarged and from a macroscopic point of view simply superinvoluted. Examination with the microscope, however, shows sclerotic changes in the uterine blood vessels. The smaller vessels in the mucosa are increased in number and their walls, instead of consisting of practically nothing but a layer of endothelium, are thickened by a deposit, around which is a layer of concentric lamellæ of fibrous tissue with well-stained nucleii. This condition is a local affection which does not involve the uterine artery and is not associated with a sclerosis of the other vessels of the body. The diagnosis of it can be made only by exclusion. It was first noted, according to Barbour, by Pichevin and Petit in 1895 (*Gaz. méd. de Paris*, Nov., 1895) and has since been discussed by Barbour himself (*Jour. Obst. and Gyn. of Brit. Emp.*, 1905, vol. 7, p. 387) and by R. L. Dickinson (*Brooklyn Med. Jour.*, 1906, vol. 20, p. 45). Let me utter a word of caution here, however, against considering every woman who suffers from hemorrhage at the menopause, and has been shown free from cancer, to be a case of capillary sclerosis. There are many cases of "symptomatic hemorrhage" at the time of the climacteric which recover with rest, packing, and the exercise of a little patience.

Calcification of the Uterine Blood Vessels.—Henri Arnal, in a thesis on the senile uterus (Abst. by P. Petit, *La sem. gyn.*, 1906, vol. 11, p. 33) has pointed out that calcification of the uterine blood vessels is by no means infrequent, being present in fifty per cent of the uteri observed by him. The degeneration begins in the middle fibrous coat of the artery and extends towards the periphery or the inner coat, sometimes invading and breaking down the latter. The degree of calcification is not in proportion to the age of the patient; for example, there were no more calcified vessels in a woman of eighty-seven than in another woman of sixty. It seems probable, therefore, that other factors than mere age enter into the degenerative process, possibly the same which are observed in angio-sclerosis of the uterus before the menopause, or in neuro-arthritis. These vascular lesions are liable, of course, to cause the formation of intraparietal hematometra, accompanied by more or less hemorrhage, and this form of metrorrhagia, which has been little noted, is important, because any hemorrhage from the uterus after the menopause is liable to be taken as evidence of cancer. In any suspicious case the uterus should be curetted and the scrapings carefully examined. This condition is frequently associated with grave vascular lesions in other parts of the body; one patient of Petit's died from the effects of a pulmonary embolism and another from a thrombus in the left cerebral hemisphere.

I have investigated the frequency with which the different local causes just discussed are found in menorrhagia, with the following results: Out of three thousand nine hundred and fifty-four gynecological cases treated in the Johns Hopkins Hospital between June 11, 1894, and March 25, 1899, there were six hundred and seven in which hemorrhage from the uterus occurred. The local causes associated with them are these:

Carcinoma uteri, one hundred and sixty cases, or twenty-six and three-tenths per cent.

Myomata (simple and uncomplicated), one hundred and twenty-nine cases, or twenty-one and three-tenths per cent.

Myomata (complicated with pelvic inflammatory disease), twenty-two cases, or three and six-tenths per cent.

Pelvic inflammatory disease (alone), eighty-three cases, or thirteen and seven-tenths per cent.

Abortion and sequelæ, forty cases, or six and five-tenths per cent.

"Endometritis," thirty-two cases, or five and three-tenths per cent.

Retroflexion of the uterus, twenty-nine cases, or four and eight-tenths per cent.

Relaxed vaginal outlet, twenty-three cases, or three and a half per cent.

Polypi of uterus, twenty cases, or three and two-tenths per cent.

Extra-uterine pregnancy, seventeen cases, or two and eight-tenths per cent.

Cystoma of the ovaries, twelve cases, or one and nine-tenths per cent.

Other causes were: Anteflexion of the uterus; sarcoma of the uterus; each three cases. Stenosis of the cervix uteri; sarcoma of the ovary; pregnancy; each two cases. Pyometra; hematometra; corpus luteum cyst; retroposition; hemophilia; cyst of Gartner's duct; fibroma of the ovary (malignant); dilated glands; subinvolution; gland hypertrophy; "menorrhagia and metrorrhagia;" each one case.

Of the six hundred and seven cases, eighty-seven showed menstruation to be prolonged or profuse, or both; and of these eighty-seven, fifty-seven, or sixty-five per cent, were cases of myoma of the uterus, including myomata complicated with pelvic disease.

CONSTITUTIONAL AND VASCULAR CAUSES.

The diagnosis of uterine hemorrhage arising from constitutional or vascular causes must rest upon the history of the case and the exclusion of any local cause. In young girls the establishment of the menstrual function is often attended with irregularities which may manifest themselves in excess as well as in deficiency. The following case is an illustration of how much may be done in such menorrhagias by patience and the employment of palliative measures.

Miss G., age sixteen, J. H. H., No. 11750, Dec., 1904. The patient was always in good health until she was fourteen, when she began to menstruate. Menstruation was too frequent and too profuse from the onset, the periods recurring every two weeks. At first the flow lasted only two days, but by the end of two years, at which time she entered the hospital, the hemorrhage had become almost continuous. Her hemoglobin count was then only forty-eight per cent. She had been curetted three times and the last time a surgeon of high standing had said that the hemorrhage was caused by cancer and that a hysterectomy was the only means of saving her life. I curetted her as soon as she came under my care, and removed an excessive amount of pale, flabby, endometrium, in long projecting tufts. She was discharged at the end of three weeks, but the hemorrhage shortly returned and she was re-admitted about four months later. Her hemoglobin count was then only forty per cent. I curetted the uterus again and cauterized it, with relief from hemorrhage for nearly a year, when the flow again became excessive. I then curetted a third time, making in all six curettings in three years. This last curettage was in May, 1906, and in June, 1907, a little over a year, she was free from more than a slight excess in menstruation.

There is a rare form of chlorosis in which the uterus and ovaries, instead of being small or even infantile, as is usually the case in this affection, are markedly increased in size, while menstruation, instead of being deficient in amount, is excessive.

An occasional constitutional cause of menorrhagia, not often recognized, is syphilis. B. MacMonagle, of San Francisco, has had a case of persistent menorrhagia which nothing relieved until a complaint made by the patient of dizziness and a tendency to fall down, suggested specific disease and led Dr. MacMonagle to prescribe iodide of potash; this relieved the head symptoms, and immediately afterward the menorrhagia disappeared.

In making a diagnosis as to the cause of any case of menorrhagia, the physician will do well to bear in mind the age and condition of the patient. If she is a young girl, malignant disease of any kind may generally be excluded, and in all probability several other local causes. In the case of young girls the irregularity is most apt to be caused by the slow and imperfect development of the uterine vessels, in the last stage of her corporeal evolution. Chlorosis is sometimes associated with this state of things. Young girls are also apt to suffer from an excessive flow following influenza, pneumonia, scarlet fever, or small-pox. A persistent hemorrhage in their case is sometimes associated with a glandular polyp, or, more rarely, with a polypoid endometritis. Family tendencies must also be borne in mind. In unmarried women between thirty and forty years of age, excess of menstruation is most likely caused by a slight displacement (retroflexion as a rule), in cases where the increase begins suddenly. When the onset is gradual, it is probably caused by a polyp, or else by a fibroid tumor, or, quite frequently, by tuberculosis of the uterine tubes.

In married women, a threatened or an incomplete abortion must always be assumed as the efficient cause until its existence is disproved. Fibroid tumors also frequently come into play with this class of cases. Almost every woman who presents herself in the late thirties with large fibroids and a history of menorrhagia will also give a history of an excessive flow for some years previous, the cause of which had not been recognized.

After the age of thirty-five, cancer comes into play as an active cause of hemorrhage. The frequency with which this disease exists makes it imperative to be always on the watch for it, in order that it may be recognized at the earliest possible moment. Every week of delay in active treatment (extirpation) of cancer is precious time lost. If a woman over forty is troubled with an increasing instead of a diminishing menstrual flow, sometimes marked in its earliest stages by a watery discharge, and if, on examination, the uterus is found somewhat enlarged, cancer of the uterine body is to be suspected

The investigation of any case of uterine hemorrhage should be carried on as follows: First, a careful history must be taken in which the patient's age and condition are noted, together with her family history and its tendencies. Second, a careful physical examination of the chest and abdomen must be made, when, if anything amiss is discovered, as for example, a bad heart lesion, the diagnosis may be cleared up at once. I have seen a case in which the patient came into the dispensary complaining of menorrhagia and with a history which suggested no local cause except, possibly, incomplete abortion. It was observed, however, that she was extremely short of breath, and examination of her heart showed that it was enormously dilated. Examination of the pelvic organs showed no local trouble of any kind. Systematic treatment for the heart lesion improved her general condition greatly and with this improvement the menorrhagia was also much relieved.

Let me here utter a word of protest against the too hasty local examination of young unmarried women made by many practitioners and pseudo-specialists. In almost all such cases it is best to assume that the simpler condition (e.g., constitutional disturbances) accounts for the trouble, and to use appropriate remedial measures for general treatment, endeavoring above all to gain the kindly aid of time in setting things right. If, however, an excessive flow persists in spite of all measures for its relief, an examination should be made under an anesthetic, when appropriate measures for relief can be taken at the same time.

In a married woman, or in an unmarried one with a long history of excessive menstruation, there should be no delay in making an examination. A simple inspection of the introitus, revealing the deep bluish color of pregnancy, may clear up the diagnosis at once. The finger introduced may at once touch a polyp lying in the vagina or feel its smooth surface just within the cervix. A softened cervix is a sign of pregnancy, while a nodulated enlarged cervix, due to endocervicitis, or a friable cancerous cervix speaks for itself at once. A bimanual examination is next in order to detect any enlargement of the uterine body, should it exist, and if it does, to determine whether it is uniform and more or less globular, in which case it is due to pregnancy, to a subinvoluted uterus, a cancerous uterus, or a polyp within the uterine body. Fibroid tumors are usually asymmetrical and multiple. Diseased conditions lateral to the uterus, such as the unilateral tumor of extra-uterine pregnancy, a malignant ovarian tumor of greater or less size, or the hardness and tenderness induced by an inflammatory condition of the ovaries, if they are marked, may all be at once detected.

If the diagnosis is not clear, it is best for diagnostic purposes to make a more thorough examination of the uterus and the lateral structures by putting the patient completely under the control of the examiner through the use of an anesthetic. Whenever an anesthetic is used for diagnostic purposes, it is well to obtain the patient's consent beforehand to the performance of any simple operation which may be required, such, for example, as a curettage.

Let me note here that the cases which most often escape diagnosis are those in which there is a small polyp or fibroid tumor, perhaps not over half an inch in diameter, in the uterine cavity. In several such cases occurring in women under forty, where I have excluded every other local cause, I have opened the body of the uterus through the vagina by detaching it from the bladder and splitting it up the anterior wall; or else, through the abdomen, making an incision in an antero-posterior direction through the fundus into the cavity, as though I were about to cleave the organ into two parts. A little tumor inaccessible by the ordinary means of exploration has thus been discovered and removed with entire relief of the hemorrhage. A case of this kind is the following:

The patient complained of excessive flow; and on examination the uterus felt enlarged and thick, but nothing else could be observed. The cervix was therefore pulled down to the outlet, dissected away from the vaginal vault, and freed nearly up to the os internum. It was then split up into the uterine cavity and the finger introduced. A mucous polyp as large as the end of a thumb was at once felt on the posterior wall towards the left. This was curetted off with a large scoop curette. The cervix was then closed with buried catgut sutures and the vagina united, with a narrow iodoform gauze drain in the centre.

Several times, on opening the uterus in this way, I have found nothing but a peculiar feathery condition of the endometrium, particularly marked in the cornua of the uterus, and after this had been thoroughly removed by the curette the hemorrhage ceased.

In the midst of all these possible causes, the diagnosis of the cause of uterine hemorrhage may, to a comparatively inexperienced practitioner, appear a matter of the utmost difficulty. This is not the case, however, for, as a rule, it is quite easy to say that the hemorrhage springs from a certain source within a few minutes after seeing the patient. As soon as the causes just discussed receive a little clear analysis they will be found to fall into groups, and therefore it is not necessary to go over every possibility with painstaking care in order to reach a diagnosis by exclusion. For example, if a patient comes into the physician's office out of breath and cyanosed, and the fingers touching the pulse detect an irregularity, there is at least a suggestion that the cause of the uterine hemorrhage which she complains of lies in a valvular heart lesion. Again, a patient with extreme anemia comes in, and in answer to the question whether the anemia began first and was followed by the hemorrhage, or vice versa, she asserts that the hemorrhage came first. This makes it clear that the hemorrhage is probably due to a local lesion, and if the hand placed upon the abdomen recognizes an enlarged nodular uterus, the cause is apparent—the hemorrhage comes from uterine fibroids. Or, it may be, that the patient volunteers the information that she was pregnant one or two months when the hemorrhage began, when examination will likely reveal a threatened or an incomplete abortion.

When there is no obvious cause the question must be approached somewhat after this manner: There is no manifest systematic disease and judging by the fact that the trouble began recently, the cause is probably a local one. This being the case, a pelvic examination must be made, when it may be that the vagina will be found normal and that there will be no evidence of lateral disease in the tubes and ovaries, but as soon as the cervix is seen the matter will be settled by the evidences of carcinoma. From this time on then, the whole attention can be concentrated upon the uterus as the organ from which the hemorrhage proceeds and as that in which the cause of it is to be found.

If, however, the cervix proves normal, the next question will be: is the uterus enlarged? If it is, the enlargement, if nodular, may be due to a myoma or a sarcoma; or if it is uniform, to a pregnancy or a carcinoma of the fundus. It must always be borne in mind, however, that small nodules may be found in carcinoma.

If all these manifest signs fail, the patient must be more minutely examined under anesthesia and, if necessary, the uterus must be dilated and curetted, in order that the scrapings of the mucosa may be examined under the microscope, for such an examination may reveal an incipient carcinoma, an endometritis, or the remains of an abortion.

TREATMENT.

The treatment of uterine hemorrhage in order to be efficient must reach the cause; it is plain, therefore, that a correct diagnosis is essential to a cure. Sometimes it happens that the diagnosis and the treatment proceed *pari passu*, as, for example, in curettage of the endometrium, when a diagnosis is made and a cure effected at the same time.

The hemorrhage arising from irregularity in the establishment of menstruation in young girls is best treated as a physiological affection of the young tissues which are taking on a new function. Rest is the prime factor in such cases, that is to say, rest in bed for two to three days in each menstrual period, beginning, if possible, before the flow appears. Dr. Ethel Vaughan finds that many young girls are entirely relieved by abstinence from active exercise, such as long walks, the use of the bicycle, or playing tennis just before menstruation. If due precautions of this kind are observed for from six months to a year, a proper norm will probably be established. It is most important to keep the bowels well regulated, and a course of tonic treatment is an excellent adjuvant. I should, for example, give arsenic and quinine in some such formula as this:

℞ Acidi arsenios. .... gr. $\frac{1}{30}$
Quin. sulph. .... gr. $\frac{1}{2}$
Extr. calumb. .... gr. j
M. et ft. pil. j. Mitte tales l.
S. One pill three times daily.

Iron is best avoided in this class of cases and ergot is of no value. Strychnin, however, is often useful. A good way to equalize the circulation is to draw blood from the pelvic organs by giving the patient a hot bath and putting her to bed. If, in spite of all precautions and general remedial measures, the flow continues excessive, an examination must be made, and if the case seems suitable for curettage it may be performed at the same time. In treating young girls or young unmarried women, no benefit arises from persistent local treatment in the form of douches and applications; such measures as these should in every case be assiduously avoided. Attention of this kind is well described as "gynecological tinkering."

In cases of severe hemorrhage it becomes necessary to treat the hemorrhage independently of the local cause, which must be dealt with later on. The measures likely to be useful in immediate treatment are as follows: Rest in bed in the recumbent position with the foot of the bed elevated about ten inches. Absolute quiet must be enforced in the patient's room, no visitors should be admitted, and all occasion for excitement or worry excluded. The bowels must be carefully regulated, preferably with salines. Some of the medicinal remedies discussed below should be given, and, if the flow still persists, the vagina must be tamponed according to the directions given.

In extreme cases it may be necessary to give an injection of normal saline solution. The best method of doing this is to infuse the solution into the cellular tissue under the breasts, as follows: two bottles are prepared, each containing a litre (thirty-four fluid ounces) of a sixth-tenths per cent salt solution, at a temperature of 100° F. This can be prepared by adding a small teaspoonful of common salt to a pint of water. A rubber tube, six feet long, is placed in each bottle, attached to which is a long, slender, sharp aspirating needle. Instead of two bottles and tubes, one bottle can be used with a Y attachment. The solution must be free from all organic particles, such as bits of cotton from the plug in the bottle in which it has been sterilized. The skin of the breast is carefully disinfected, after which the breast is grasped and lifted up from the chest, while the needle, with the salt solution flowing into it, is thrust into the cellular tissue, well under the glandular substance. The bottle is elevated above the patient about six feet, in order to give a sufficient hydrostatic pressure to force the fluid into the tissues. As a rule, it requires about twenty minutes to infuse from seven hundred to a thousand cubic centimetres of the solution under both breasts, taking one after the other. If the symptoms are urgent, both breasts may be infused at the same time. As the infusion proceeds the gland becomes greatly distended, and not infrequently the salt solution spurts out of the nipple in a fine jet. At the completion of the operation, a piece of adhesive plaster must be placed over the point of puncture, to prevent a reflux of some of the injected fluid. In none of the cases in which I have employed this form of repletion of the circulation has there been the slightest ill effect in the way of local inflammation about the breasts.

The various measures for the relief of uterine hemorrhage may be divided into four classes; namely, medicinal, mechanical, surgical, and constitutional.

Medicinal Measures.—There are various drugs which have considerable influence in controlling uterine hemorrhage, though there are none which can be depended upon to effect a permanent cure.

Ergot.—Ergot is a remedy much in use formerly, but largely abandoned now. It is given in the form of the fluid extract, dose fifteen drops in water, or as ergotin, dose one-tenth to three-fourths of a grain in pills.

Hydrastis canadensis.—This drug, commonly known as Golden Seal, has a direct action on the vaso-motor nerves and is therefore useful in cases of sub-involution, interstitial fibroids, and all forms of uterine congestion. The dose of the fluid extract is fifteen to thirty drops in water, three or four times a day; or it may be given in the form of hydrastin, dose one-eighth to one-fourth of a grain in pills. It is best to give it during the intermenstrual period or else to begin the administration a week before the flow is expected.

Viburnum prunifolium.—This is a remedy highly recommended for use in the menorrhagia associated with constitutional conditions, or in that which accompanies the establishment or cessation of menstruation. The fluid extract is the best form for its use, dose thirty drops to two teaspoonfuls.

Apiol.—Apiol (garden parsley) has recently been much spoken of in the treatment of menorrhagia. I have seen a case in which it gave great relief. It should be given between the menstrual periods in the form of capsules, dose three to six minims, several times a day, or else it should be begun just before the period and continued through the first day or two.

Stypticin.—This is a drug which has found favor in the treatment of uterine hemorrhage within the last few years. Abegg (*Centrbl. f. Gyn.*, 1899, vol. 23, p. 1333) has written of it in the most favorable terms. Unlike ergot it does not cause uterine contractions, its hemostatic action being central. The blood pressure is lowered and it has a certain sedative action which relieves the pain associated with menorrhagia. According to Gottschalk, it is useful in the following conditions: (1) Climacteric hemorrhage; (2) subinvolution which does not depend on placental or membranous retention; (3) hemorrhage of reflex order, caused by disease of the appendages or of the parametrium, when the uterus itself is healthy; (4) congestive hemorrhage in young girls; (5) hemorrhage due to fibroids (but not to submucous polyp). In Gottschalk's opinion the action of the drug is more certain if it is injected into the gluteus muscle. For hypodermic use a ten per cent aqueous solution is best, the dose being one to two minims.

Styptol is recommended by K. Witthauer (*Centrbl. f. Gyn.*, 1904, vol. 28, p. 997) as being cheaper and more efficacious than stypticin. The dose is one grain, three times daily, until the flow begins, when one and a half grains are given every three hours through the period.

Adrenalin.—The extract of the adrenal glands has been given for the relief of menorrhagia with some success. The dose is fifteen drops of a 1:1000 solution, three times a day.

Calcium Chloride.—This is occasionally of service, in doses of five grains after each meal during the intermenstrual period, the frequency being increased to intervals of two hours during menstruation.

Gallic Acid.—This is a remedy highly recommended by T. A. Emmet and, more recently, by W. L. Taylor. Both Emmet and Taylor advise combining the acid with cinnamon, which has also, in their opinion, a beneficial effect in controlling hemorrhage. It may be done after the following formula:

℞ Acidi gallici	ʒij
Tinct. cinnam.	fʒvj
Aq. dest., q. s. ad.	f℥vj

M. S. One tablespoonful every three or four hours.

In cases where there is marked congestion of the uterus or ovaries, Taylor finds great benefit from combining one of the bromides with cinnamon and ergot in the following formula:

℞ Ferri exsiccat.	gr. viij
Potass. bromid.	ʒjss.
Ext. ergot. fl.	fʒij
Tinct. cinnam.	f℥vj

M. S. One to two teaspoonfuls three times daily.

Mechanical Measures.—The mechanical measures used for the relief of uterine hemorrhage are: Hot douches; tampons (packs); cold applications; electricity; intra-uterine applications.

Hot Douches.—This mode of treatment is highly recommended by many authorities. The mode of administration is as follows: The patient should lie in the dorsal position with the hips on a bedpan, so that the vaginal vault is below the orifice of the vagina and the water will be in direct contact with the pelvic organs while it is in circulation. The temperature should be between 110° and 120° F. A lower temperature than this is not only ineffectual, but injurious, because, instead of stimulating the blood vessels to contract, it relaxes them. Each douche should last from fifteen to twenty minutes, and one to two gallons of water is usually sufficient. Twice a day, morning and night, is generally often enough to use a douche, but there are some cases in which it may be necessary to give it three times a day. As a rule, the injections are used between the menstrual periods and discontinued when menstruation appears, but if the flow is greatly in excess, there is no objection to using them throughout the period.

Vaginal Tampons (packs).—The vaginal tampon is a most efficient means of controlling uterine hemorrhage. In cases where the amount of blood is greatly in excess from the beginning of the flow, the tampons should be introduced soon after menstruation begins, but if the loss of blood is due to prolongation of the menstrual period, it is better to wait for several days after menstruation has been established before inserting the pack. Tampons are made of non-absorbent cotton, of wool, of lamb's wool in bulk, or, sometimes, of strips of gauze. To insert the tampons a trivalve speculum is necessary, if the patient is in the dorsal position; a Sims' speculum, if the Sims' position is used; or, better still, a Kelly's cylindrical metal speculum, with the patient in the knee-breast position, when the vagina balloons out and is easily distended with a firm pack to its utmost capacity. A tampon should remain in place from eighteen to twenty-four hours. When it is removed the parts should be carefully cleansed by a douche and another pack inserted.

Uterine Tampons.—Intra-uterine tampons of sterilized gauze may be used, packed very tight and left in position for forty-eight hours. These cannot be introduced, however, without extensive dilatation of the cervix, and they are not generally of much service, except in abortions. Bouriaut of Geneva has suggested that intra-uterine injections of a two per cent solution of glycerin should be used instead of tampons. Ten to fifteen cubic centimetres (about half an ounce) of the solution are injected and the injection is repeated two to four times, if necessary. The method is highly recommended in hemorrhage from uterine atony, and that due to fibroma (cited from Monod, *Montreal Med. Jour.*, 1905, vol. 34, p. 22).

Cold Applications.—In cases where excessive hemorrhage must be stopped at once, the application of cold may be tried by placing an ice-bag over the lower abdomen and another over the lumbo-sacral region. This is not, however, a mode of treatment which is often advisable, as patients suffering from loss of blood usually require the stimulating effect of heat.

Electricity.—The treatment of uterine hemorrhage by electricity, much advocated some years ago, has now fallen somewhat into disuse. The results from it, however, were often favorable, and there seems no doubt that it is of service in a good many cases and may obviate the necessity for a radical operation.

The application is made by means of a platinum electrode, with a movable insulating sheath. The electrode is passed up to the fundus of the uterus, while the insulating sheath is adjusted so as to reach just beyond the internal os. As the bleeding comes from the body of the uterus, it is absolutely necessary to see that the current affects the body of the uterus and not the cervix. Moreover, strong currents cause stenosis of the cervical canal. A large clay pad is placed on the wall of the abdomen, just above the pubes, and connected to the negative pole, while the intra-uterine electrode is connected to the positive pole. At the first application, only a mild current should be used, not more than twenty milliampères; subsequently it can be slowly raised until the galvanometer indicates thirty-five to fifty milliampères. This is kept up for from ten to fifteen minutes. The patient need not stay in bed during the progress of the treatment, and, except in extreme cases, she can come to the physician's office to receive it.

The applications are made twice a week. An antiseptic vaginal douche should be used every morning and evening. The electrode must, of course, be absolutely clean and should be placed in an antiseptic solution like any other instrument before being used. The number of applications will vary according to the severity of the case. Half the number required to reduce the amount of blood lost to normal proportions must be given to produce permanent relief. The treatment is suspended for a week during menstruation, but if the flow has not ceased at the end of that time, it is resumed. In some cases, where there is an incessant flow, there may be some difficulty in knowing exactly what is the proper date for menstruation, but by closely questioning the patient it will generally be found that in one week out of every four the loss is greater than at any other time, and this may be taken as the normal time for menstruation. As a rule, no improvement begins until several applications have been made, and then the flow diminishes rapidly. With a current of twenty milliampères, properly applied and slowly raised, the patient feels little, if any pain. The sensitiveness of the uterus, which is present at first, usually goes off after the first two or three applications (J. E. Parsons, *Lancet*, 1901, vol. 1, p. 547).

Intra-uterine Applications.—The application of caustics to the interior of the uterus during the intermenstrual periods is often of great service in controlling uterine hemorrhage, and of these caustics nitric acid is the best. Before using it the vagina must be carefully protected with gauze packed around the cervix. It is best to use a cylindrical speculum, which fits snugly around the cervix, and pass up the fuming nitric acid on a pledget of cotton by means of an applicator to the fundus. Great care must be taken to avoid any excess of the acid, and the applicator must be immediately withdrawn.

Surgical Measures.—Operative procedures are far more often indicated in the treatment of menorrhagia and metrorrhagia than in dysmenorrhea or amenorrhea, for many cases of uterine hemorrhage are due to grave organic disease which requires surgical measures for its relief; moreover, the effects of frequent or prolonged loss of blood upon the general health is serious enough in itself to call for operative interference in some cases. The only operation for the relief of uterine hemorrhage which comes within the scope of this work is curettage of the endometrium. This is a simple measure, easily performed, and giving excellent results in a large number of cases, provided care is exercised in the selection of suitable cases and in the performance of the operation. It frequently happens that the general practitioner is called upon to perform it for the relief of uterine hemorrhage, and also for the purpose of ascertaining the nature of the disease present from an examination of the scrapings. Whenever the general practitioner discovers, or has reason to suspect that his patient is suffering from malignant disease of any kind, it is his duty to refer her at once to a specialist, no matter what may be the inconvenience or discomfort to her or her relatives, nor how plausible the reasons for delay. Fibroid tumors, also, in some cases, demand radical measures for their relief, but there are many cases of uterine hemorrhage associated with abnormal conditions of the endometrium, such as retained products of conception, endometrial hypertrophy, endometritis, submucous fibroids, or polypi, in which curettage is beneficial, and often effects an entire cure, if not at once, within a few months, and possibly after one or two repetitions.

The operation is one of such simplicity that its performance is quite within the province of the general practitioner, under due precautions, and therefore I give a description of it in detail.

Method of Curettage.—The patient is prepared and cleansed, and the uterus dilated according to the directions given for dilatation in Chapter IV (see p. 108). The serrated, sharp, perforated spoon curette (see Fig. 52, p. 109), poised between the thumb and the first and second fingers, is then easily introduced into the dilated canal. The whole inner surface of the uterine cavity from the fundus to the cervix is next carefully scraped, the superficial portion of its lining membrane being removed in strips and short pieces. The healthy basis is recognized by the greater resistance and by a slight grating sensation communicated to the fingers. The separated lining membrane is expelled through the cervix by means of a series of intermittent contractions and the discharge may also be assisted by using the curette to scrape it out. The hemorrhage from this operation is never sufficiently severe to call for measures to control it. Some persons are in the habit of introducing gauze into the uterine cavity, but it has never been my custom. The patient should be kept in bed for from three days to a week.

Before I leave the subject I should like to say a word of caution in regard to the danger which accompanies curettage, if it is not attended by the same care and vigilance practiced in every surgical procedure, and especially those requiring an anesthetic.

If the uterus is soft or the condition of the body wall pulpy and like wet blotting paper (a condition not to be recognized by any digital examination) then the curette or the sound may pass directly through the uterine wall into the abdominal cavity, and, in a septic case, set up a virulent peritonitis. In order to avoid this contingency, the operator must guard against using much force, the curette must be handled with the greatest gentleness and should never be pushed against the uterine wall. If the instrument should perforate the wall, it must not be reintroduced; a drain should be inserted, and the patient put to bed and watched. If the case is known to be septic, and the curette passes through the uterus, the abdomen should be immediately opened, the area excised, and the opening closed with catgut.

W. Hessert (*Amer. Jour. Obst.*, 1905, vol. 51, p. 26) has collected from the literature a number of cases in which the uterus has been perforated during curettage and gives the following general principles which should be observed in order to avoid such an accident:

(1) Make an accurate pelvic diagnosis, as to size, position, mobility, and consistency of the organ. Determine the presence or absence of tumors upon or within the organ. Observe, if possible, its contractility. Determine the condition of the adnexa and the possi-

bility of pus tubes, ovarian tumors, pelvic abscesses, and the like. In other words, get as clear a picture as possible of the pelvic organs.

(2) In curetting post-partum, bear in mind the possible extreme friability of the uterus. The cervix should be amply dilated to admit the finger. The direction of the cervical canal and the uterine cavity should be accurately determined by means of a graduated sound. The question of angulation backwards or forwards should be known before introducing dilators, especially Goodell's. Disregard of this precaution has been the cause of most perforations made with Goodell's dilators. Avoid the ratchet and screw, but use the hands in dilating carefully. Dilate slowly, so as not to split the cervix, meanwhile turning the instrument around to all points of the circle.

(3) A sharp curette is best for the purpose. Be careful in the use of the placental forceps in pulling down anything which may be felt in the uterine cavity, as it may be omentum or gut. Never use a volsella forceps for this purpose.

(4) Except in the presence of septic endometritis the use of the irrigator is generally superfluous. If it is used, a non-toxic solution, such as boric acid, should be employed. Avoid strong solutions, such as sublimate. If there is the least suspicion of perforation, omit all irrigation. The injection of caustics, such as liquor ferri chloridi, tincture of iodine, chloride of zinc., etc, is not without danger, and should be employed only where there are special indications.

Any condition causing atrophy of the uterus is one which, by rendering the uterus unduly friable, is likely to result in perforation. The local conditions associated with uterine atrophy are: carcinoma, myoma, pelvic tuberculosis, pelvic abscess, recent abortion, and others.

The general or constitutional conditions accompanied by atrophy are leukemia, diabetes, nephritis, Addison's disease, tuberculosis, pernicious anemia, and the acute infectious diseases.

Curettage for Remnants of Abortion.—Curettage for the removal of a dead ovum or the remains of an incomplete abortion requires a few words of special direction, because of the danger arising from the readiness with which sepsis may invade the upper genital tract in the presence of either of these conditions. In cases which are already septic, the avoidance of a general infection and the safety of the patient depend upon the complete removal of the ovum and the establishment of artificial drainage through the dilated cervix. There is no way by which a septic uterus can be thoroughly disinfected. Cases which are not septic will not become so, if the operation is aseptically performed and the aseptic conditions maintained afterwards. In curettage shortly after an abortion has taken place, the anterior cervical lip is caught with a tenaculum forceps, a blunt spoon curette is introduced, and used with gentle force over the whole surface of the uterus, loosening and bringing down the membranes, which begin to pour out of the os. Undue force must not be used, lest the curette perforate the softened uterine wall and pass into the abdominal cavity, exposing the patient to the imminent risk of a septic peritonitis. I have known a case in which curettage was performed two and a half months after an early abortion (three weeks) in which several blocks of firm whitish material were removed from one side of the uterus, when, without the use of any force whatever, the curette suddenly perforated the fundus. After loosening the membranes with the curette a pair of fenestrated placental forceps is inserted, which brings away the placenta, the decidua, and the fetus, if it has not been previously expelled, whole or in pieces. When the canal is large enough, as is usually the case in a miscarriage after the third month of pregnancy, the index finger, well sterilized, should be inserted and the whole interior of the womb palpated. Unsuspected pieces of tissue may be found clinging to it, especially in the placental area. These can be freed by the palmar surface of the finger, assisted by the external hand acting through the abdominal walls and affording a point of resistance. The uterine wall, thus bared in places, feels almost as thin as paper and must be gently handled. When curettage is difficult and uncertain, the entire separation of the remains of the ovum may be effected by the finger alone, assisted by the hand making counter-pressure through the abdominal walls. The finger-nails must never be used to scrape off tissue from the uterine walls, as such a practice would often introduce sepsis, and if the case is already septic, the operator would be sure to carry infection away with him to inoculate other patients. Irrigation of the uterus after curettage for abortion is not necessary, unless the contents are septic, when the cavity must be repeatedly washed out with a warm boric-acid solution, introduced by means of a curved glass douche nozzle, the blunt end of the nozzle being used to aid in detaching clots and small particles of débris. The uterus may be drained for forty-eight hours by packing its cavity loosely with gauze, the ends of which are allowed to hang out of the cervix into the vagina; my own practice, however, is simply to place a loose pack in the vagina, which is renewed every twenty-four hours. Patients should be kept in bed for two weeks or longer after curettage for abortion, in order to allow involution of the uterus to take place. Care of the patient is just as important at this time as in the puerperium after a normal labor.

Examination of Scrapings Removed by Curettage.—The scrapings from the endometrium should always be examined, for they afford reliable evidence as to the nature of the condition underlying the hemorrhage. The following conditions should always be looked for:

Normal uterine mucosa.
Acute endometritis.
Chronic endometritis.
Decidual endometritis.
Mucous polypi.
Remnants of abortion.
Tuberculosis of the tubes and ovaries.
Carcinoma of the uterus, body and cervix.
Sarcoma of the uterus, body and cervix.

The formalin method of preparation, first introduced by Dr. T. S. Cullen (*Johns Hopkins Hosp. Bull.*, April, 1895), and later by Pick, is the best, as it obviates the tedious delay incident to the older methods of preparation and permits a diagnosis to be made, in case of necessity, with a competent pathologist at hand, within fifteen minutes.

The procedure is as follows:

(a) Place frozen sections of the fresh tissue in a five per cent aqueous solution of formalin for from three to five minutes.

(b) Immerse in fifty per cent alcohol for three minutes.

(c) Place in absolute alcohol one minute.

(d) Wash in water.

(e) Stain in hematoxylin for two minutes.

(f) Decolorize in acid alcohol.

(g) Rinse in water, to which has been added two or three drops of ammonia, which rapidly brings back the characteristic hematoxylin color.

(h) Stain with eosin.

(i) Transfer to ninety-five per cent alcohol.

(j) Pass through absolute alcohol, creosote, or oil of olives, and mount in Canada balsam.

When it is not of the first importance to save time, finer sections may be obtained by Cullen's second method, in which the tissues are first hardened in formalin, as follows: The sections are placed immediately in a ten per cent solution of formalin, kept in small bottles always at hand. Within three or four hours they are sufficiently hardened to cut readily, when frozen sections are made and left in a fifty per cent solution of alcohol for three minutes, after which the succeeding steps are taken as before described.

Curetted specimens must always be placed in a bottle by themselves and labelled at once with the patient's name and the date. When the sections are cut, no similar open dishes containing other specimens should be lying about, nor should sections under consideration be passed through the fluids together with other sections, in order to avoid the terrible mistake of confusing the two cases and so leading to erroneous conclusions. Serious mistakes have followed the mixing of specimens.

Normal Uterine Mucosa.—The standard for comparison from all curetted specimens is the normal uterine mucosa; this presents, microscopically, an even surface covered by a single layer of cylindrical ciliated epithelium. The glands are round or oval-shaped on cross section, and in a few places they may be seen to open on the surface. They are usually equidistant and are lined with one layer of cylindrical ciliated epithelium. An occasional bifurcation is seen in the deeper layers of the gland. Lying between the glands is found the stroma of the mucosa or so-called lymphoid tissue. The cells, however, are much larger, and on close examination bear no resemblance to lymphoid tissue; the nuclei of the stroma cells are oval, vesicular, and appear to best advantage in specimens hardened in Müller's fluid. The arteries of the stroma are usually found in small bunches; the veins are large, single, and thin-walled. The blood in the veins is separated from the stroma cells by one layer of epithelium. The line of demarcation between the mucosa and the muscle is usually well-defined; occasionally, however, a gland penetrates the muscle for some depth, when it is invariably accompanied by a considerable amount of stroma. This dipping of a gland in the muscularis must not be mistaken for a pathological condition.

The appearance suggestive of malignant disease, whether carcinoma or sarcoma, will be found described in Chapter XXI (see p. 503). The other conditions in regard to which conclusions can be drawn from the examination of curettings will be found under their separate headings in the diagnosis of menorrhagia.

Constitutional Measures.—Under this head come those measures which may be employed to remove the constitutional causes underlying certain cases of uterine hemorrhage. Cardiac and hepatic disease are both sometimes associated with menorrhagia, or metrorrhagia, or both, and when this is the case the relief of the underlying cause will relieve the local hemorrhage. In cases of cardiac derangement, digitalis in tonic doses, ten to fifteen drops, three times daily, is frequently of great benefit. After the heart's action has been improved, strychnin and arsenic are of value. A marked rheumatic diathesis must receive appropriate treatment as well as anemia or scurvy. For hepatic derangements, calomel is usually indicated, with attention to diet, exercise, and general hygienic measures of every kind.

General Suggestions.—In conclusion, the following suggestions may be made as to the treatment of uterine hemorrhage in general:

If the hemorrhage is due to the retained products of conception, to hypertrophy of the endometrium, endometrial polypi, endometritis (acute or chronic), submucous myomata, or decidual endometritis, curettage is certainly indicated, and will afford relief in a large proportion of cases. It is better to resort to this measure as soon as the diagnosis is clear than to wait to try a long course of topical treatments which rarely, if ever, do any good. It must always be remembered that it may be necessary to repeat the curettage several times. Should curettage of the endometrium reveal the presence of cancer, sarcoma, chorio-epithelioma or extra-uterine pregnancy, the patient must be at once referred to a specialist, no matter what difficulties, real or imaginary, are put in the way of such a course. Cases of subinvolution or inversion of the uterus, interstitial or sub-peritoneal myomata, sclerosis of the uterine vessels, or corpus luteum cysts, should also be sent to a specialist, although there is not the same pressing need for haste as in the cases mentioned above. Fibroid tumors giving rise to uterine hemorrhage must be differently treated according to the indications in each individual case; these are discussed at length in Chapter XX. Uterine hemorrhage due to constitutional or vascular causes is distinctly the work of the general practitioner and must receive his most careful attention. The indications for treatment in such cases belong to the works on general medicine in which the conditions underlying the uterine hemorrhage are discussed. It is greatly to be desired that physicians in general should make this class of patients the object of their careful study, for they are more likely to be benefited by the attention of the general practitioner than that of the specialist.

EXTRA-UTERINE PREGNANCY.

History.—Few subjects in the whole range of his practice excite so lively an interest in the general practitioner as extra-uterine pregnancy. Of all the mysterious processes of life, the most mysterious is that an ovum can become fertilized and grow on ground foreign to its normal development. Natural interest in this extraordinary phenomenon is great and it is enhanced by the fateful possibilities of the situation as well as the tragic outcome which may, at any moment, determine a doubtful diagnosis and rob the poor victim of life. For these reasons, and because such cases fall, in the first stage, into the hands of the family physician in the majority of cases, it is important that he should know something in detail of the course of such pregnancies not interrupted by the surgeon; of the methods of their diagnosis; and of the proper means for their relief.

Extra-uterine pregnancy was once thought to be extremely rare, but it is now known to be comparatively common. There are few physicians who have been ten years in practice without seeing at least several instances, sometimes in a single year. Veit has shown that many of those cases of irregular menstruation associated with colic, which pass off without special treatment, or with a little watchful attention on the part of the physician, are, in reality, a relatively mild ending to an extra-uterine pregnancy. For this reason, as we can readily see, all deviations from the norm during pregnancy ought to excite the liveliest attention on the part of the responsible medical attendant.

It may be said then that extra-uterine pregnancy in its early stages belongs to the general practitioner; as soon as the diagnosis is made, however, the case should at once, as a matter of propriety, be transferred to the domain of the surgeon. If it were possible, it would be best for the patients if all cases could be classified as surgical from the outset. As to the promptitude with which this transfer is effected from the purely medical to the purely surgical domain, it is interesting to note that the experience of one case is sufficient to quicken the diagnostic powers to such a degree that subsequent cases are detected much earlier, and in consequence subjected to a relatively earlier appropriate radical treatment, which is always operative and extirpative. In order to grasp his subject properly, the general practitioner must be familiar with the causes of extra-uterine pregnancy, with its course if left alone, and with the various diagnostic signs, which we will now take up.

An extra-uterine ovum may lodge in any one of the six places indicated in

Figure 65, proceeding from within outwards: (1) in the ovary; (2) in the tubo-ovarian fimbria; (3) just within the grasp of the tubal fimbriæ; (4) in the ampulla; (5) in the isthmial or narrow part of the tube; (6) or, finally, in the interstitial portion of the tube, where it traverses the uterine wall. The commonest of these sites is the ampulla implantation and the next commonest the isthmial. The interstitial form is rare and of the ovarian only a few examples have ever been seen.

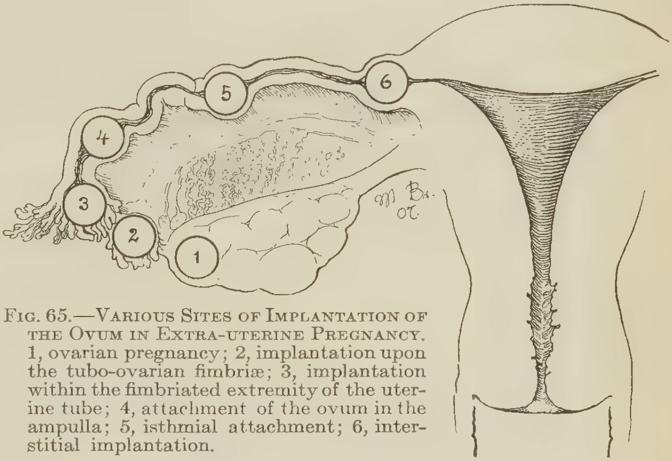

Fig. 65.—Various Sites of Implantation of the Ovum in Extra-uterine Pregnancy. 1, ovarian pregnancy; 2, implantation upon the tubo-ovarian fimbriæ; 3, implantation within the fimbriated extremity of the uterine tube; 4, attachment of the ovum in the ampulla; 5, isthmial attachment; 6, interstitial implantation.

Etiology.—There is no one cause which can be said to be commonly operative in extra-uterine pregnancy, and this is only what we might reasonably expect from our knowledge of pregnancy in its early stages. The spermatozoa meet and fructify the ovum at or near the ovary, and it is the function of the uterine tubes, which have afforded the spermatozoa an avenue of access from the uterus to the ovum, to transmit the ovum in turn to its proper resting place in the uterus. The small spermatozoa travel up the uterus and down the tube by their own active propulsive movements, while the larger ovum must be swept towards the uterus, through the ampulla of the tube, past all the tubal folds, into the narrow isthmus, and so through the interstitial portion of the tube into the uterus, where it commonly lodges near one cornu.

An extra-uterine pregnancy is brought about by any cause whatever which tends to hold the ovum back until it is too large to travel further down the constantly narrowing tube. Let us note categorically, and with but brief discussion, what these efficient causes may be:

1. Adhesions may bind the tube down, or bands may cut across it, so as to produce an ileus, as it were, preventing the propulsion of the ovum, while not necessarily hindering the spontaneous movements of the spermatozoa. This is the oldest view and undoubtedly the obstruction operates in many cases, though it must be borne in mind that many of the adhesions and inflammatory changes seen at an operation have occurred after the pregnancy and not before it; therefore they cannot be reckoned among the causes in a particular case.

2. Tumors of the tubal mucosa have been noted as plugging the lumen of the tube, accounting for the obstruction in a few rare instances. Fibroid tumors at the uterine cornu, distorting and blocking the isthmial portion of the tube, have been found occasionally.

3. A tubo-ovarian cyst, by distorting the tube, may sometimes act as a cause. (See Fig. 66.)

4. Inflammation of the tubal mucosa by which its cilia are destroyed, has been noted also, though, as Bumm remarks, this view presupposes the presence of enough cilia to carry the ovum to its lodging place.

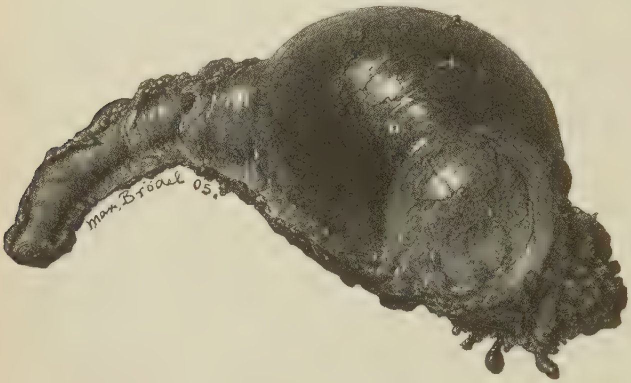

Fig. 66.—H., Church Home, January 23, 1903. Pregnancy in the ampulla in which a striking feature is the presence of the cyst lying under the tubo-ovarian fimbriæ. Hemorrhage to the amount of about 1½ liters into the peritoneal cavity. Operation. Recovery. Nine-tenths natural size. (Case of T. S. Cullen.)

5. Diverticula in the tube sometimes serve to catch and lodge the ovum, wrapping it around as it were. These diverticula, however, are so commonly found in normal tubes, that it is evident some other cause must first act to retard the progress of the ovum before it slips into the diverticulum.

6. A long, narrow, winding tube of the fetal type is undoubtedly the cause in some cases.

7. The migration of the ovum into an atretic tube. The spermatozoa enter by a patulous tube and fertilize the ovum, which then passes over into the opposite atretic tube. (See Fig. 67.)

8. Many extra-uterine ova contain monstrous fetuses; in such cases the size of the ovum must act to hinder its advancement and so cause a tubal implantation.

It will be seen from these facts that not one, but many causes are continually acting to make extra-uterine pregnancy a common ailment in every community.

The determination of the cause in any given case can only be made, if at all, at the operating table, or rather after the operation in the pathological laboratory. Even then, with every possible advantage afforded by clinical history, a careful operation, and the benefit of numerous microscopic sections, it is often impossible to say why the extra-uterine pregnancy occurred.

The only aid the practising physician can derive from the operation is the knowledge derived from statistics that there is a peculiar liability on the part of those women who have had one extra-uterine pregnancy to have another. All of our extra-uterine pregnancy cases ought therefore to be watched with a peculiar solicitude lest they become pregnant again, and if they do become pregnant, lest it turn out to be an ectopic growth.

Accidents which may happen to the ovum in extra-uterine pregnancy are many. It practically always ends its existence by a violent death, caused by

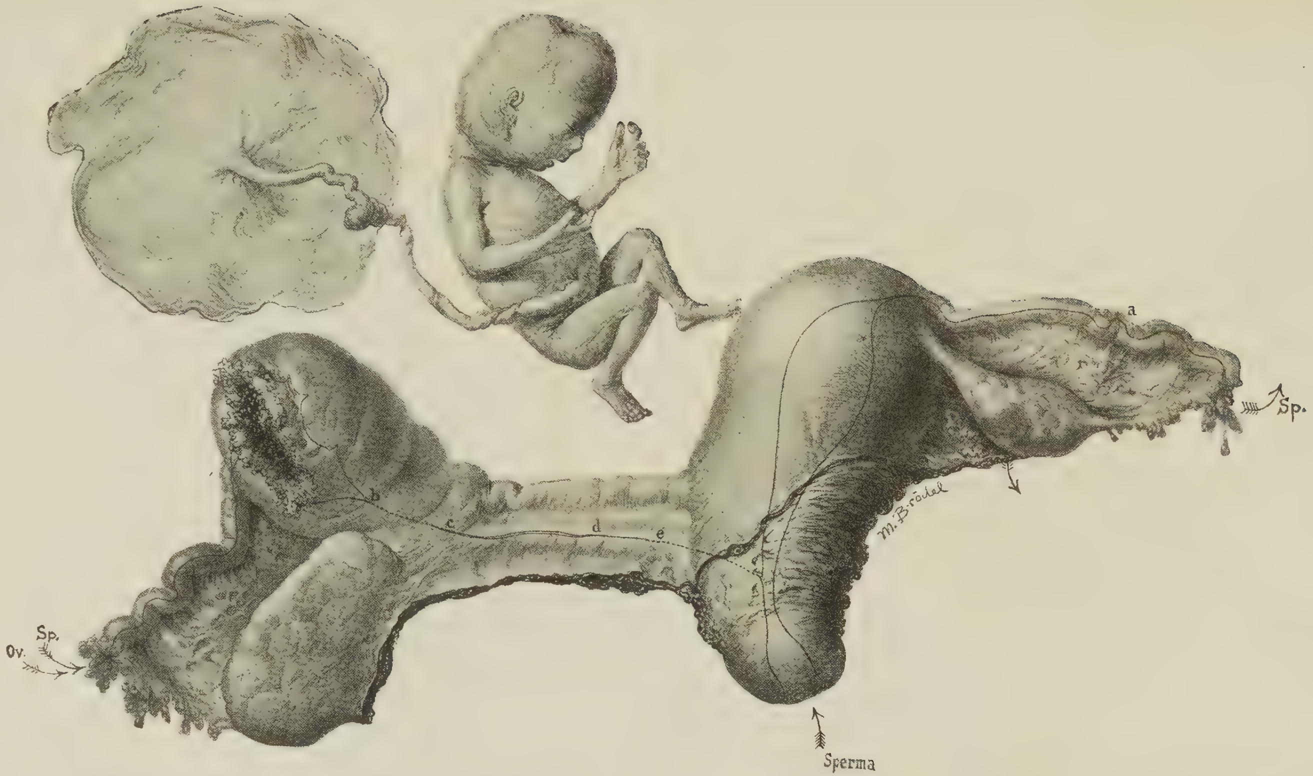

Fig. 67.—Pregnancy in a Rudimentary Left Uterine Horn; Rupture; Death. The specimen is viewed from behind. To the right is the well-developed uterus, which, after reaching the internal os, deviates to the right side. Attached to the cornu is the right tube, which is normal. The ovary is of the usual size, and at its inner and lower portion is the corpus luteum of pregnancy. Springing from the left side of the uterus at the internal os is a muscular band; on tracing this to the left it merges into the rudimentary uterine horn. On the posterior surface of this horn is a long slit representing the point of rupture. Protruding through the rent are placental remains. The left tube passes off from the outer side of the rudimentary horn. The left ovary is flattened. The line on the well-developed uterus indicates the size of the uterine cavity. The line *b*, *c*, *d*, *e*, indicates the course of the left Müller's duct. Between *c* and *d* it contains a lumen; where it is represented by dotted lines it consists of a solid muscular cord. Above the specimen are the placenta and fetus drawn in normal size. Natural size.

the rupture of its containing sac (see Fig. 68), or by a tubal abortion, by which it slips out of the sac into the peritoneal cavity. (See Figs. 69 and 70.)

Sometimes the ovum, encapsulated in a surrounding hemorrhage, deprived of its nutrition, dies, and shrinks into an innocuous hard nodule in the tube; this termination is unusual. Only in the rarest instances, once out of thousands of cases it may be, does the extra-uterine fetus go on developing to term.

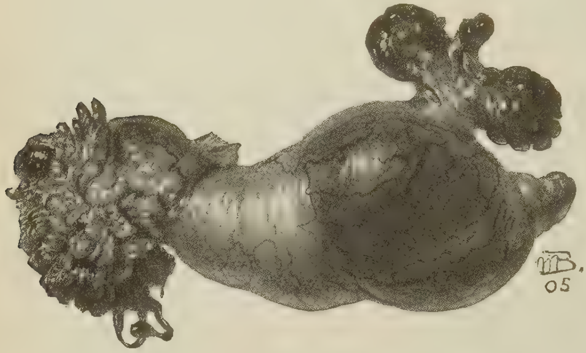

FIG. 68.—R. W. U., AUGUST 17, 1903. GYN. No. 10672. THE RIGHT UTERINE TUBE IS SEEN TO BE THE SEAT OF AN EXTRA-UTERINE PREGNANCY, WHICH HAS RUPTURED, DISCHARGING BLOOD INTO THE PERITONEAL CAVITY. THE SEAT OF RUPTURE IS PLUGGED BY CLOTS AND VILLI.

Then false labor pains come on, and if the condition is not recognized and the babe removed by an abdominal section, it dies and becomes mummified in the midst of the intestines, to undergo changes resembling adipocere later on; or, incased and infiltrated with lime salts, to form a lithopedion or stone child. Although the fetus is apparently thus satisfactorily disposed of, it is not and never can become a safe guest, as long as it is harbored in the body. It is likely at any time to cause an intestinal obstruction through adhesions, or to set up an inflammation which only ends when it has been discharged bone by bone from the rectum, the bladder, the vagina, or through the abdominal wall, it may be years afterwards.

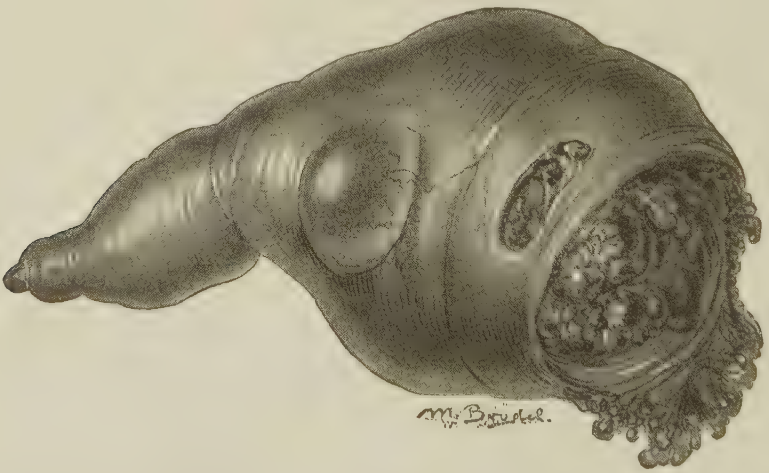

FIG. 69.—EXTRA-UTERINE PREGNANCY; TUBAL ABORTION. The bleeding is checked by a large coagulum distending and thinning out the tube; the fimbriated opening is greatly distended, but the greater diameter of the clot in the ampulla prevents its escape. Wall of tube averages 1 mm. in thickness. Operation. Recovery. July 7, 1896. Natural size.

Diagnosis.—The diagnosis of an extra-uterine pregnancy in the early months is almost always made after the rupture of the sac; it is not difficult to make, if the striking set of signs which I will enumerate categorically, with brief annotations, are borne in mind.

1. There has been a cessation of menstruation, perhaps one or two periods, or the patient may have gone but a few days or a week over the time.

2. Nausea and other changes which the patient is accustomed to associate with an early pregnancy are noted as the weeks pass by.

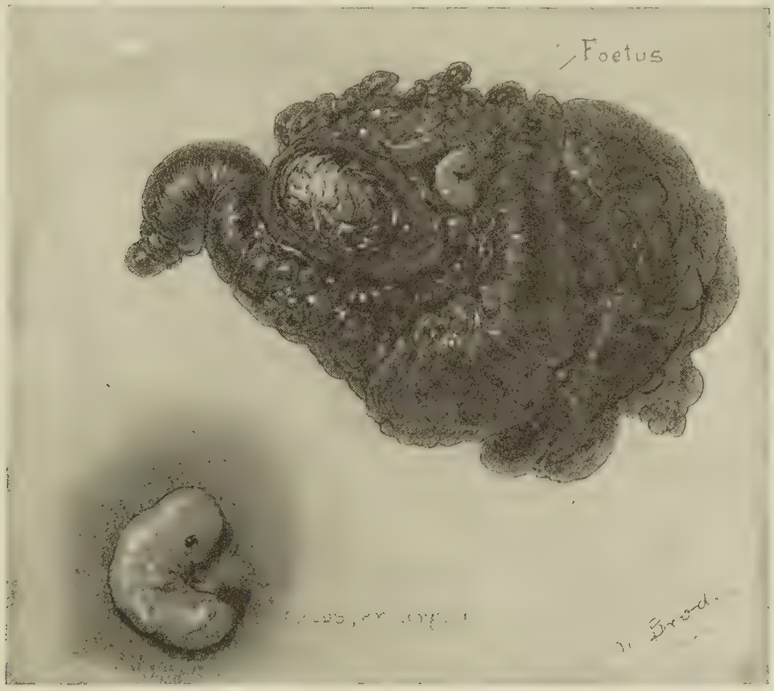

Fig. 70.—Coagulum Turned Out.—Showing a cast of the tube extending up into the isthmus. On its surface lies the fetus. Natural size.

3. The patient thinks she is pregnant, but is inclined to believe there is something wrong or unusual with this particular pregnancy.

4. Recurring pains in one side are often noted.

5. A sudden attack of agonizing pain sometimes constitutes the first symptom. This may come on in sleep, but it is apt to appear during exertion, as while sitting in the closet, or at work reaching or lifting.

6. With the pain comes collapse and the sudden development of extreme and increasing anemia.

7. Sighing, gasping, respiration which is rapid and small mark the worst cases.

8. If the patient survives her first attack, she suffers at

intervals from repeated similar ones, with irregular uterine discharges.

Objectively, the physician sometimes (but not always) notes:

1. The blue or cyanotic vagina, so indicative of pregnancy.
2. An enlarged uterus, as big as a two months' pregnancy, rarely larger.
3. A tumor, at the side of or behind the uterus but always more or less one-sided, which is peculiarly sensitive to touch.
4. If the sac has ruptured, the blood poured out causes the tumor to grow rapidly, increasing with each successive severe pain and coincident hemorrhage. Sometimes the lower abdominal wall shows a boss as big as a fist. To the vaginal touch the tumor feels peculiarly boggy and lacks the well-defined outline of other tumors, or the hardness of inflammatory affections.

If there is no rupture, nor escape of the ovum or blood through the fimbriæ of the tube, then the fetus dies and the sac shrinks, while under an observation extending over two or three weeks. This is a rare finding and ought never to be waited for. The breasts show milk as the pregnancy goes on developing. The patient often declares that she has passed a shaggy skin-like structure (decidua), or, more fortunately, keeps it to show to the physician and ask his opinion as to its nature. The decidua may come away in shreds, or it may be found only on curetting the uterus; this should always be done in a case of uncertainty. The finding of decidua, or the passing of a decidual cast in the presence of a uterine tumor, practically settles the diagnosis.

The anemia is often so profound that the patient is almost undistinguishable from her own bed sheets. The pulse is tiny and thready, or may even have vanished at the wrist. There is little or no fever until the clots become infected.

Not all of these signs must be expected in any one case; indeed, the picture is rarely a complete one. A few are sufficient for practical purposes, of which the most important are:

Presumptive evidence of pregnancy.
A sensitive tumor at the side of the uterus.
The fact that the uterus contains no ovum.
Attacks of severe abdominal pain.

Four conditions are liable to be confused with extra-uterine pregnancy, namely:

Normal pregnancy.
An ordinary uterine abortion.
Salpingitis and pelvic inflammatory disease.
Appendicitis.

The diagnosis may be made between extra-uterine pregnancy and abortion, by noting the passage of an ovum in the latter, and the absence of the lateral tumor, as well as the less intense, agonizing character of the pains. If there still remains a doubt, it is best to examine under anesthesia and to curette the uterus. The danger is far greater of mistaking an extra-uterine pregnancy for an abortion, than of mistaking an abortion for an extra-uterine pregnancy. When the patient is stout and the tumor is a small one, situated in the isthmus; or when there is a flaccid ovum in the ampulla and the fluid blood is distributed through the intestines, the greatest expert may not be able to decide immediately just what the trouble is. In cases of serious continued doubt, it is best to make a vaginal or abdominal incision and set the uncertainty at rest.

A salpingitis may be accompanied by marked fever and is often bilateral. But even here a pyosalpinx may upset the diagnosis of the most expert practitioner. The symptom commonly lacking is the uterine hemorrhage; if there is time to wait and curette, there is of course no decidua. A Graafian follicle cyst or a small ovarian tumor may also be the source of an error.

In appendicitis, we have the pain, and the mass extending up into the right iliac fossa; also the fever and the increased leucocyte count; but with these signs there is the absence of anything pointing towards pregnancy nor is there a tumor to the side of the womb. It is an old diagnostic measure, and one of value, to use a small aspirating needle to puncture the vaginal vault and withdraw some of the dark fluid blood. He who has done this in the presence of a tumor and the pains in a case of presumptive pregnancy can afford to be very wise and very positive as to his diagnosis! Need I caution the physician to treat the little expedient with the same care as to asepsis as he would a major operation?

Treatment.—If the patient has been suddenly smitten down with severe abdominal pain and hemorrhage, if there is evidently some kind of a mass in the pelvis while she is markedly anemic, it is best to consider the diagnosis while getting the instruments out of the kit to open the abdomen and stop the hemorrhage. There should be no academic discussions under such circumstances, for such cases brook no delay, and he who acts or secures action most quickly will save the most lives. It is self-evident that in the presence of bleeding which will eventually destroy life, every minute is precious.

While summoning surgical aid in cases of hemorrhage, the physician should enjoin absolute rest, flat on the bed, with the legs and arms evenly bandaged from the toes and fingers up to the trunk to keep the blood in the body. The foot of the bed should be elevated from ten to eighteen inches, to keep the blood more in the heart and head. It is best not to give cardiac stimulants; digitalis especially ought never to be used.

Most important of all remedies, as a rule, is the infusion under the breasts, of one thousand cubic centimetres of a normal saline solution six-tenths per cent; that is to say one made up with a small teaspoonful of table salt to the pint of warm water passed slowly in by gravity through a large cannulated needle from a fountain syringe. It is well to consume about half an hour in this operation (see p. 170). To the saline solution may be added twenty to thirty minims of a solution of adrenalin (1:1000).

While waiting for surgical aid, much may be done to save time by getting the room ready, and by preparing plenty of hot water, towels, and clean vessels. It is often best to give the preliminary cleansing of the abdomen in bed before administering the anesthetic. The physician must see to it that the patient remains as short a time as possible under the anesthesia, and the surgeon must be ready to begin the operation as she is lifted onto the table.

CHAPTER VIII.

CONSTIPATION. HEADACHE. INSOMNIA. OBESITY.

(1) Constipation: Definition, p. 189. Effects, p. 189. Act of defecation, p. 190. Etiology, p. 194. Frequency, p. 195. Diagnosis, p. 196. Treatment, p. 198.
(2) Headache: Frequency, p. 206. Etiology, p. 206. Treatment, p. 211.
(3) Insomnia: Frequency, p. 220. Etiology, p. 220. Treatment, p. 221.
(4) Obesity: Definition, p. 226. Etiology, p. 226. Treatment, p. 227. Adiposis Dolorosa, p. 230.

CONSTIPATION.

Definition.—Constipation is the infrequent action of the bowels, in consequence of which the waste products of the intestinal tract are retained for periods of one or more days beyond the normal. Habitual constipation may also be defined as a sluggish habit of the body, in which the bowels fail to respond to the presence of the fecal matter, which should excite a desire for evacuation as it is propelled into the rectum. It is one of the commonest abnormal conditions with which the physician has to deal, and is the cause of much ill-health and discomfort in women.

Effects.—In constipation, nutrition and metabolism are interfered with and serious circulatory disturbances arise from the choking of the intestinal tract; from the copremia (constipation anemia) caused by absorption of the poisonous retained products; and from the local stasis in the hemorrhoidal vessels, which may be continued up into the portal system and into the liver.

Patients habitually constipated are apt to show it in their faces: a muddy complexion in young girls, often associated with facial acne, is characteristic of constipation. Constipation is also apt to be manifested in the temper, which is melancholic, and also in the listlessness, which takes the place of energy.

The mechanical circulatory disturbances and the poisonous products reabsorbed from the lower intestinal tract have often a pronounced effect upon the digestion, inducing, apparently, a sluggishness in the upper intestinal tract, with gas, belching, and loss of appetite.

In a word, so long as a pronounced constipation is the habit of the body, all the organs are bathed daily in blood rendered impure by the absorption of fecal products, and the consequences are usually those which might be legitimately expected.

It would be interesting and important to determine how far a habit of constipation may be responsible for the slow evolution of far graver diseases of the organs of the body cavity and of the brain.

The local expression of constipation in women is often pronounced. In the first place the retention of feces in the rectum, especially in that part which lies back of the uterus, above "the third sphincter," frequently gives rise to colicky pains in the pelvis which are easily mistaken, as are the tender masses themselves when felt through the vagina, for diseased ovaries. I once opened an abdomen thinking I had an acute recrudescence of a pelvic peritonitis, to find nothing but a mass of unchewed, undigested beans in the rectum in this situation.

The pelvic stasis produced by the constipation is not only the cause of the hemorrhoids readily seen at the anal orifice, but of a similar dilatation of the venous channels in direct communication with them above. This pelvic congestion makes itself felt in a sense of weight and bearing down, referred to the pelvis at large, and it may also be responsible for the large varices seen in the broad ligaments on opening the abdomen. To this local stasis some authors of repute refer certain cases of endometritis. A marked and a misleading sensitiveness is apt to characterize the organs involved in it. Backache of the sacral form is a common feature.

Not a few cases of dysmenorrhea in young girls are due to habitual constipation and are relieved when a daily action of the bowels is established. Constipation is commonly associated with many pelvic ailments, and is often a source of trouble after abdominal operations.

To realize the whole bearing of constipation upon the health of the individual, it is necessary to have some definite knowledge of nature's scheme for the evacuation of the bowels as the completion of the whole process of digestion.

The process of digestion attains completion in the large intestine, and by the time the food reaches the rectum all the nutritious material which can be assimilated has been absorbed, almost all the liquids have been taken back into the system, and nothing remains but an indigestible residuum, commonly known as feces. When the normal quantity of food taken into the body cavity daily is estimated, it is evident that the residue remaining after digestion and absorption of the three meals should also be daily removed, if the digestive tract is to be kept open and its functions properly maintained. In a normal condition, the rectum ought to be evacuated once in twenty-four hours, and the whole structure of the intestinal tract is arranged to further this end. The peristaltic action of the muscular coats of the large and small intestines is constantly at work to drive the food onward, while the valves occurring at frequent intervals throughout the intestines are so arranged as to facilitate its downward movement. The propulsion of the column of ingestion from the last meal also serves as a powerful stimulus to the intestinal tract beyond to empty itself into the next succeeding portion until the end of the tract is reached, where it should normally produce a desire for an evacuation.

Defecation.—Expulsion of the residual mass, which is known as the act of defecation, is accomplished through the relaxation of the sphincter ani muscles, aided by the peristaltic action of the intestinal tract above, associated with the voluntary action of the abdominal muscles. We are accustomed to think of such an action as voluntary, because the part taken in it by the abdominal muscles is impressed upon the consciousness, but it really originates in and arises fundamentally from the peristaltic action of the muscular coat of the intestines, which is independent of volition, as shown by defecation taking place under certain conditions without the knowledge of the individual; for example, it constantly occurs in this manner after the section of the spinal cord. The anatomical arrangements are such that the act of defecation, as planned by nature, should progress as a steady, gentle evacuation of the lower intestinal contents, without any risk of eversion or prolapse of the mucosa.

The regular evacuation of the bowels is largely influenced by the character and amount of the food taken into the body. If little food is eaten, there will, of course, be little residue, and if the food is too readily assimilated, it will almost all be absorbed, and there will be little or nothing to pass down into the rectum. It follows, therefore, that a mixed diet, composed of a variety of easily assimilated foods, as well as other kinds which contain sufficient fibrous, inert, and indigestible matters to form a residue, is that best adapted to the regulation of the bowels, as well as to the other needs of the body.

People who change their diet materially, or take, for a time, less amounts than they are accustomed to, as in travelling, visiting, or taking a sea voyage, are apt to suffer from irregular action of the bowels, until they have adjusted themselves to the new conditions.

In normal defecation four factors are present, namely:

(1) The lower bowel and the rectum must have something to handle; that is to say, a mass of excrementitious matter extending like a broken or faceted column upward towards the pelvic brim.

(2) The material present must excite an impulse to evacuation, that is to say, the physiological sensibility of the rectum must be normal.

(3) The mechanism of the muscular apparatus of the lower bowel, and the voluntary muscles of the abdominal walls must be such that they shall be duly able to expel the accumulated excrement.

(4) While the lower part of the column of excrement is in the act of passing the sphincter area the upper part of the rectum must in turn send down its contents to be expelled in due order.

All these conditions are fulfilled in every normal act of defecation, which, if examined attentively, will be seen to resemble a miniature act of parturition. In the first place, there are slight premonitory feelings of uneasiness, becoming more and more decided and insistent, and finally ending in a well-defined "bearing-down pain." At the suitable moment the levator ani relaxes and lets down the pelvic floor, upon which the fecal mass enters the internal sphincter area, which in its turn also relaxes. Then, with the contraction of the abdominal muscles and the forward inclination and approximation of the thighs to the abdomen, the external sphincter area yields, the bolus passes through and escapes, and the miniature delivery is accomplished. Normally defecation should represent parturition without pain. It is interesting to note that the internal sphincter muscle is in some measure under the control of the will; the act of bearing down relaxes it, while a voluntary act of drawing up, that is to say of lifting the levator and tightening the external sphincter, tightens the internal sphincter simultaneously.

The best and most efficient method of defecation and that which best economizes expenditure of force, when, as is often the case, there is a difficulty in expulsion, is found in attendance upon nature's call after the manner of all primitive people in a squatting posture in the bushes *sub Jove* (see Fig. 71). In this natural and instinctive habit lies perhaps the strongest link in the chain which binds us to-day to our ancestral life. Everywhere, the yokel who retires behind the barn, and the schoolboy who insists upon climbing up onto the seat, seek to perpetuate it, not to mention the number of highly civilized society men who day by day leave their traces behind them, as they wear off the varnish from the modern inconvenient seats with the soles of their shoes, a mute but eloquent testimony to their necessity. *Naturam expelles furcâ tamen usque recurret.*

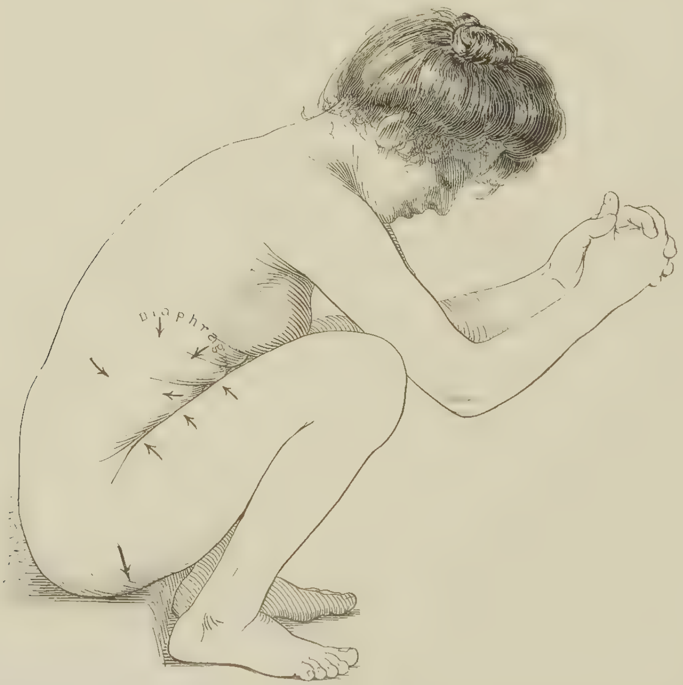

Fig. 71.—Posture in Defecation, showing the Efficient Use of Abdominal Pressure in the Crouching Position, the Anterior Abdominal Wall being Supported by the Close Application of Thighs to the Abdomen.

The disadvantage of the high water-closet seats found everywhere lies in the fact that in the act of expulsion there is no support to the anterior abdominal wall and force is lost there (see Fig. 72), as anyone can feel by placing the fingers in the inguinal rings and straining. It lies also in the fact that the direction of the strain is faulty. One of two things should be done to remedy this evil: either the closet seats ought to be set low in the floor, or a little bench ought to be provided which will bring the feet up to a point about eight and a half inches from the level of the seat (see Fig. 73). Either of these measures will necessitate widening the opening in the seat for about two inches at a point two-thirds of the way back, on account of the change in the form of the buttocks and the greater prominence of the ischial tuberosities.

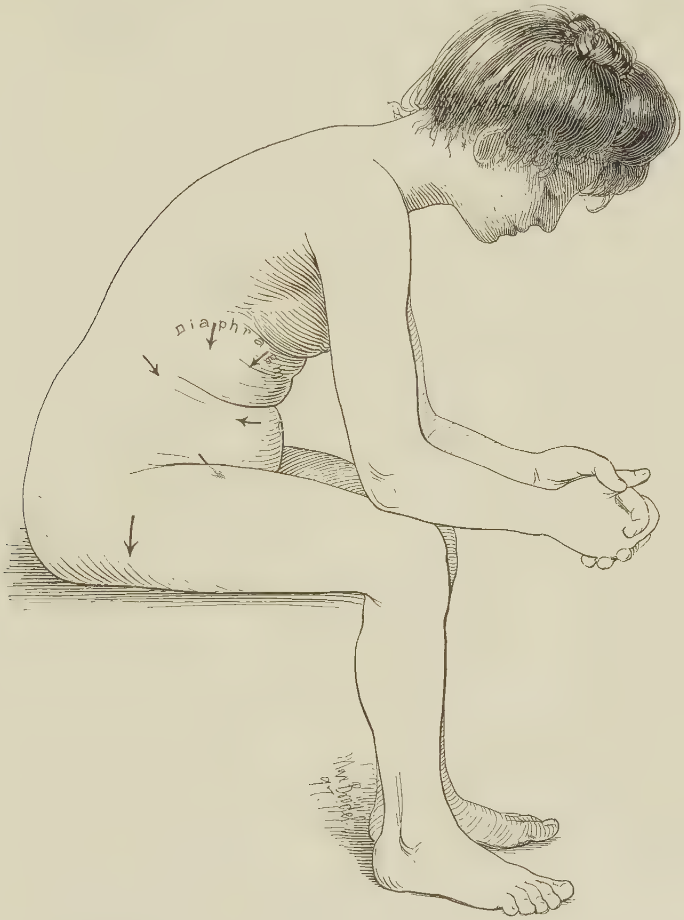

Fig. 72.—Posture in Defecation. The ordinary sitting posture with body slightly inclined, showing the loss of force, indicated by the arrows pointing toward the lower anterior abdominal wall.

The rectum does not normally harbor feces. As soon as the fecal mass descends from the sigmoid and is felt in the lower rectum it should be expelled. If the impulse is resisted, it either returns to the upper bowel by a reverse peristalsis, or, if this is prevented by the accumulation above, it remains in the rectum and blunts the normal sensibility, constipation being the outcome.

Etiology.—Retention of feces, constipation, or obstipation may arise from a variety of causes, which are:

1. Lack of a right habit in attending to the function of the bowel.
2. Lack of exercise.
3. Lack of proper food.
4. Injury to the mechanism at the end of the bowel, due to parturition.
5. Redundant sigmoid with a long meso-sigmoid.
6. Diseases of the intestinal tract, or of the pelvic organs.

It will be seen that these causes must operate more frequently in women than in men. Perhaps the most important is habit, or rather the failure on the part of the individual to establish, or to maintain a regular habit of body. Many women pay no attention whatever to the regular action of the bowels, except when forced to do so by their excessive and increasing discomfort.

The reason for this among the poor may well lie in the atrocious arrangements for the care of the bodily functions afforded by our civic authorities, whereby, for instance, one closet is made to serve for several families. In a tenement in Baltimore, two closets do service for twenty-two families (see Fig. 35, p. 48). Associated with the use of such "conveniences" is often an advertising of the necessity which borders close on indecent exposure. Better for the poor girl to restrain her natural desires and force the function into an intermittency of expression, which is marked by intervals of days. We will do well to seek here for one of the potent causes of the immorality which is everywhere on the increase.

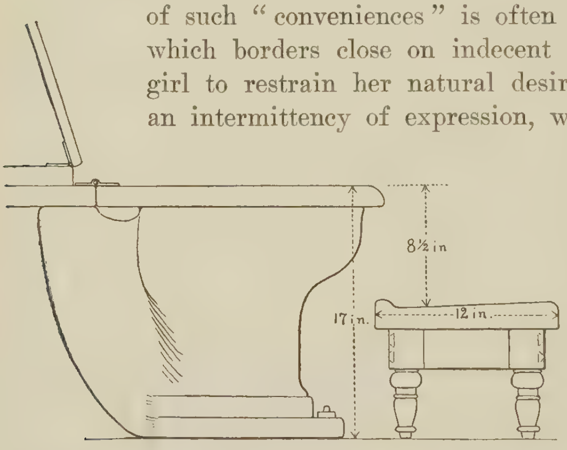

Fig. 73.—An Adaptation of the Modern Sanitary Closet to Utilize the Crouching Posture by Raising the Feet within Eight and a Half Inches of the Level of the Seat by Means of a Stool.

With the better-to-do woman, a false modesty often restrains her from attending to this function; she is afraid of meeting some one on the way. Again it is frequently put off as a mere matter of inconvenience until nature's calls are so often stifled that at last the sense grows blunt and the constipation habit is established.

Too numerous also are the cases in which a grown man or woman, whose training has been neglected in this respect in childhood, continues to suffer at maturity: the responsibility for constipation of this sort must rest on parental shoulders—a word to the wise is sufficient.

Lack of proper exercise and sedentary occupation often result in constipation. Persons whose occupations afford them little or no opportunity for active exercise are peculiarly liable to it. Weakness of the abdominal muscles interfering with the passage of the food downward is often associated with a lack of physical exertion. A feeble or capricious appetite, which interferes with the consumption of a sufficient quantity of food, is another result of insufficient exercise.

Parturition often seriously interferes with the mechanism of the lower bowel by causing a rupture of the levator ani fibres, especially those interlocking with the internal sphincter, so that the bowel is no longer lifted up, but drops forward in the direction of the ruptured perineal muscles. In such a case as this the efforts at expulsion tend to produce eversion of the vaginal outlet so that the expulsive power is lessened or rendered nugatory.

In addition to the causes enumerated, any of which may exist while the patient is in perfect health (except for the presence and the effects of the constipation itself), there are sundry diseased conditions in which retention of feces occurs. The passage of feces may be mechanically interfered with by the pressure of morbid growths, either benign or malignant, situated in different parts of the abdomen or pelvis, as well as by stricture arising from any cause whatever. Chronic disease of the intestinal mucosa may result in atony of the whole intestine, indeed Osler reckons that the most frequent local cause of constipation is atony of the colon, particularly of the muscles of the sigmoid flexure by which the feces are propelled into the rectum. ("Practice of Medicine," 1892, p. 421.)

A redundant sigmoid with its long meso-sigmoid affords a convenient place for the lodgment of fecal masses; the profession is, indeed, just beginning to attribute importance to this congenital anatomical condition as a cause of an obstinate form of constipation. Notable work on these lines has been done by Clark and Pancoast in their X-ray studies in Philadelphia. In some cases Clark has operated with conspicuous success.

Some proctologists attribute importance to a thickened inflamed condition of the rectal valves, associated with a marked overlapping of their margins, rendering the channel more tortuous.

One of the most serious hindrances to the normal activity of the bowel is a tight corset.

Frequency.—In order to ascertain something as to the frequency and the extent of constipation in my daily consultation practice, I have analysed five hundred cases from my gynecological case-books, taking them in order. The age of the youngest patient was twelve and a half and that of the oldest sixty-nine.

The total number of cases of constipation, either habitual or occasional, was one hundred and sixty-four out of five hundred, or about thirty-three per cent. Of these, sixteen are noted as occasionally constipated, while seventeen suffered to an extreme degree. Only fifty-seven of the hundred and sixty-four were accustomed to use any means to overcome the difficulty, forty-four of this number taking medicines of various kinds, and thirteen using an enema. Another noticeable fact is that in almost all of the cases in which there was no record of any means employed for relief, the constipation is noted as excessive or as having existed for a number of years.

The number of these cases suffering from headache may be taken as a rough indication of the extent to which the body in general was affected by the loaded condition of the bowels. Of the hundred and sixty-four, eighty complained of headache in varying degrees of severity, while five suffered from dizziness without actual pain, making, in all, rather more than half of the entire number. In some of the cases in which the constipation is noted as most marked there was no headache at all, while others, where it was mild or occasional, suffered intensely with it. In some cases of habitual constipation attacks of sick headache with nausea and vomiting were noted as accompanying the menstrual periods. The number of cases in which there was any indication of irritation of the intestinal mucosa was small, as there were only five cases where there was mucus in the stools, and but two where there was blood.

Diagnosis.—In making a diagnosis of constipation as the cause of symptoms complained of, the first point to be established is that it exists, and this is a matter of less simplicity than it seems. So many women, as I have said above, pay little or no attention to the condition of the bowels that the physician is constantly liable to be assured that they act with perfect regularity, when they are really emptied only every three or four days. It is necessary that he should be explicit in his inquiries and that he should make sure the patient understands that nothing but a daily motion is considered normal.

When it is established that a constipation is present, we must next consider its form and its causes, ascertaining the following facts:

1. What is the state of the general health?
2. What amount of exercise is taken?
3. Is sufficient food ingested to form a fecal mass demanding expulsion?
4. Where does this mass lodge? Is it in the sigmoid flexure and descending colon?
5. Is there an accumulation in the caput coli?
6. Is there an accumulation in the rectum?

It is sometimes convenient to classify the constipation according to the different parts of the large intestine in which the fecal matter tends primarily to lodge: as rectal, and, if rectal whether ampullar or upper rectal, that is, above the utero-sacral ligaments; or sigmoid; or colic. Obstructive forms of constipation, when the obstruction is low down, say in a concentric narrowing of the rectum due to cancer, often develop slowly and insidiously.

In order to ascertain to which of the above classes the constipation belongs the patient must go without a purgative for two, three, or more days; during which time careful daily examinations must be made in order to determine where the feces lodge. In a woman, palpation will reveal the presence of any considerable accumulation in the region of the cecum, which when clogged has a doughy pasty feel, is movable and often sensitive. Only in extreme cases can masses be felt above the cecal region in the transverse and the descending colon. Not infrequently, however, they can be perceived in the sigmoid flexure, which is perceptible to the touch in the iliac fossa, or behind the symphysis, or near the promontory. A rectal and vaginal examination will reveal the presence of feces in the lowest portion of the bowels. In these cases I constantly use the protoscope, introducing it as far as the sacral promontory. The patient is put in the knee-breast position and by using a long speculum, eighteen centimetres long and twenty to twenty-two millimetres in diameter, I can examine the whole lower bowel. In young women it will often prove that the lower bowel is empty and that the difficulty lies in the fact that the fecal mass does not descend into the rectum. Such an investigation is invaluable in suggesting approximate methods of treatment, of which I shall speak later.

Another form of constipation, which can be detected by this method of examination, is that in which the overloaded bowel is only relieved of a portion of its contents at each act of defecation. It is often a good plan to examine women who are much troubled with constipation within an hour or two after what they consider to be a satisfactory evacuation.

In women who have borne children, the vaginal outlet should always be examined in order to ascertain whether there is a rupture of the muscular fibres and a consequent tendency to eversion. This eversion can be produced artificially by inserting one or two fingers into the rectum and pushing the mucosa forward in the direction of the vaginal outlet until a marked pouch is formed by the protruding vaginal mucosa.

It must next be ascertained how long the constipation has existed and, if possible, what occasioned it. If it is habitual and has lasted a number of years without any known definite starting point, it is probably the result of careless habit; but if it has developed recently, after years of regularity, the possibility of some local cause must be considered, such as pressure from a pelvic tumor, a malignant growth in the intestine itself, or a stricture. The diagnosis of these affections belongs to the surgeon, but the general practitioner should be able to decide upon their probable existence.

To review then, in any given case it must be determined: that constipation exists; that it is of mild or severe type; that it is associated with such and such local or general disturbances; that the patient is or is not free from organic disease. A careful palpation of the abdomen must be made to detect the lodgment of fecal matter at the head of the colon or in the transverse and descending colon, especially at the flexure; an endeavor must be made to map out the sigmoid flexure; and lastly, a local pelvic examination must be made to determine whether there is or is not an obstruction which may account for the constipation on purely mechanical grounds.

It is a good plan to fill out some such scheme as this in the case-book:

Constipation note:

Name.	Age.	Weight.

1. How long has constipation persisted?
2. Did it follow any acute disease or change in habits?
3. Does it date from a confinement?
4. What are the longest intervals between evacuations?
5. What remedies has the patient been accustomed to use?

Treatment.—The treatment of constipation is three-fold: (1) preventive; (2) to relieve the present condition by unloading the bowel; (3) to regulate the function so that it will act automatically and without artificial aids.

(1) Prevention.—The first point in the treatment of habitual constipation is the establishment of a regular daily habit. This applies especially in the training of young girls, with all of whom a daily effort at a fixed time is sufficient to create a habit which becomes at last a second nature. The morning call, to one thus trained, becomes an imperative demand which is never neglected. In those who have not too long neglected this salutary habit, the mere attitude of expectation, created by a persistent morning visit to the closet, is enough after a while to regulate the function. A case in point which shows the influence of the mind over the body, is one where the patient suffered extremely from constipation until she became a "Christian scientist," after which she made an effort to empty the bowels every day, sitting with Mrs. Eddy's manual of Christian Science in her hand, with perfect success!

The treatment of constipation by mental influences is strongly advocated by Paul Dubois ("The Psychic Treatment of Nervous Disorders") as follows:

"I would dare to say that the cure of constipation is certain if one uses these means, but if this treatment is to be efficacious it must be prescribed with entire conviction. This I insist upon, and to those who want to make the attempt I will give the following advice: (1) Draw the patient's attention to the inconvenience of laxatives and enemas; prohibit them altogether; burn your bridges without fear. (2) State that one always succeeds by this intelligent treatment. If you have already had some success along such lines in your practice, describe them with convincing eloquence. (3) Ask your patient when he gets up and takes his breakfast. You can, to a certain degree, take his habits into account. If he gets up at half-past seven, for example, give him the following prescription in writing: (*a*) 7.30 A.M.—Rise. (*b*) 7.45 A.M.—Drink a glass of cold water. For those who have a superstitious reverence for medication give an infusion of quassia prepared the evening before. (*c*) 8 A.M.—Hearty breakfast with milk, coffee or tea, according to choice, and even chocolate for those who are not constipated by this food. Use bread (Graham, if possible) and butter, with honey or preserves. (*d*) 9 A.M.—Try to go to the toilet at a fixed hour. Do not go at any other time and refuse to do so, saying to your intestine: 'You would not move at nine o'clock; now you can wait until to-morrow!' (*e*) Use a copious diet, giving the preference to vegetable foods.

"But do not be content with enumerating these measures and putting them on paper; explain them, comment upon them, and enumerate the 'invitations' which the prescriptions contain. The patient will reply to you: 'But I have already tried to go at a fixed hour. I have already taken a glass of cold water.'

"You can reply to him: 'My dear sir, six cannons can make a breach where one or two are not enough. Go on bravely and you will succeed!'

"And last of all, do not suppress the suggestive effect which you have just produced. An excellent confrère, who for long years practised this treatment, told me that he was well satisfied with it, but that he had, nevertheless, had some failures. Astonished at this, I made him go over the prescriptions which he had given. They were as complete as though I had dictated them myself. I tried to find the cause of the failure, when my confrère added: 'However, I have never discouraged the patient and I have told him if this does not work there are still other means!' This counter-suggestion was sufficient to explain his failures. When one wishes to convince one of anything it does not do to suggest the idea of possible failure."

Those who would prevent constipation must also see to it that their patient's diet is of a proper sort, not too highly seasoned, nor of concentrated fancy foods, and not too much meats, but sensible amounts of simple, bulky, nutritious articles, such as are constantly found on the table of the farmer. A diet largely vegetarian, starchy foods, legumes, coarse bread, fruits, fresh and stewed, all conspire to regulate the function and to make it easy of performance.

Let me enumerate a list for selection: Oatmeal and various breakfast cereals with cream. Graham bread, rye bread, corn bread, bran bread, Boston brown bread, dry Swedish bread, German Schwarzbrod, which can now be bought in most of our large cities. Plenty of fresh butter on the bread, for fats generally help to relieve constipation. Honey or molasses at breakfast. Soft boiled eggs, cabbage, sauerkraut, cauliflower, lettuce and salads of all kinds, spinach, peas, Lima beans, string beans, lentils, carrots. Fruits, especially stewed prunes, figs, and plums; in the berry season all berries with seeds are valuable aids.

The best beverages are plain water and buttermilk.

I would suggest some such simple regimen as this to start with:

A glass of cold water on rising.

Breakfast:

Oatmeal, cream of wheat, etc., with cream. Bread with plenty of butter; corn bread, or corn cakes, or Johnny cake, with honey or molasses; soft boiled eggs, fish. Weak coffee, buttermilk, malted milk.

Lunch:

A little cold meat, rice, caviar, sardines, anchovies. Potato, string beans, asparagus. Salad. A simple pudding; cheese and crackers; baked apples.

Dinner:

A thick soup, bread or cheese straws. Shell fish. Celery, olives, radishes. White or sweet potatoes and vegetables of all kinds *ad libitum.* Salad. Nuts *ad libitum.* Fruits. Grape juice.

I have made no allowance here for a fashionable dinner in many courses.

Some people find that an apple eaten every day in the evening or in the morning regulates the function.

Again so simple a device as a glass of cool water in the morning on rising is all that is needed. It may be that hot water is more agreeable as well as more acceptable to the stomach. A glass of cool water containing a little lime or lemon juice is often more effective. Sometimes patients do not drink enough water, and for such persons a glass of water every two hours between meals should be prescribed. An invaluable simple medicament acting like the natural mineral waters is the phosphate of soda taken every day, a teaspoonful in a glass of water early in the morning.

Daily exercise is a prime requisite. Let no one, adult or maiden, think that this important function will regulate itself if they simply eat, and sit, and talk, and dawdle about. Active stimulating exercise is imperative; a good long walk in good company, golf, horseback, swimming, rowing, or at a pinch, *pour pis aller,* home gymnastics in the fresh air of a well ventilated room with the windows wide open. Equally important with general muscular exercise is the care of the skin by a daily cold bath followed by rubbing with a coarse towel, and deep breathing exercises associated with the regular muscular exercise.

When the abdominal muscles are lax, especially after confinement, they can be strengthened by lying flat on the back and rising to a sitting posture by the abdominal muscles alone without any aid from the hands or arms. C. v. Wild even recommends these gymnastics several times a day for the puerperal patient from the tenth to the twelfth days onwards.

If a young woman will discard the rigid tight-fitting corset when she begins to take exercise adapted to making her breathe deeper and strengthen her loins, she will have taken one most important step towards regulating this function.

(2) Galvano-faradism.—This form of treatment is recommended by Erb ("Handbuch der Elektrotherapie"). The galvano-faradic current has proven of great use in stimulating the atonic bowel into normal activity and in overcoming chronic constipation. Bröse, who writes after considerable experience, found that out of twenty-nine cases of chronic constipation treated by this means alone, twenty-eight were relieved, the remaining patient giving up the

treatment because there were no perceptible results after five sittings ("Die Behandlung d. chron. Obstipation mittels d. Galvano-farad. Stromes," *Festschrift zu Prof. Dr. Meyer*, Göttingen).

Bröse used a strong galvanic current of from fifty to seventy-five milliampères and a faradic current as strong as the patient could bear. He made use of large electrodes eight by eight inches in size, placing the positive pole on the sacral region and the negative on the abdomen. The sittings averaged from four to six for milder degrees of the condition, to thirty or forty in more severe varieties.

C. v. Wild uses the same remedy somewhat differently. The patient lies upon her back with her head raised a little and with knees drawn up. She rests upon one pole, a plate nine by twelve centimetres (about three and a half by five inches) while a round electrode is used on the anterior abdominal wall. The anode is used behind, the kathode in front. The current employed is of a strength of five to ten milliampères and is given by pressing the electrode deep into the walls. Decided contractions of the muscles in the abdominal wall can be avoided, if necessary, by weakening the faradic current. That current is best which is felt to excite definite peristaltic contractions, easily recognized through thin walls. The sitting lasts about five minutes. The result of such a treatment is often prompt, but subsequent treatments are needed to increase and render permanent the effect.

Out of twenty-six cases treated in this way, twenty-four are noted as cured, while two gave up the effort. The number of treatments varied from fifteen to one. With increasing experience the worst cases were relieved in six sittings.

If the patient will not regulate her diet and exercise, nor make a faithful attempt to evacuate the bowels at a certain hour, adapting her diet and beverages to encourage this regularity of habit, then nothing remains but to resort from time to time to some of the numerous devices all of which are for a time more or less efficient. The worst thing that can be done is to treat a case of constipation by simply prescribing as the ultimate goal one of the well known and often much advertised popular remedies, familiarly known as "little black pills," French grains, or by their initials as A. S. & B. pills.

Sänger, in a most earnest appeal (*Centrbl. f. Gyn.*, 1890, vol. 14, p. 349) insists on giving up all these common medicaments, which as he declares, never cure, but only serve to fix and perpetuate a constipation, forging the chains of habit upon one who has sought the physician to find deliverance. At the utmost these vaunted constipation remedies should be used but for a short time for temporary effect and merely as expedients on the way to better things, namely, the cure of the evil. In the old or infirm, where hygienic measures cannot be carried out, their use is not so objectionable.

For such a purpose cascara sagrada in one or other of its two forms, namely, the solid or the fluid extract, is the simplest and best remedy.

℞ Ext. cascaræ sagradæ	gr. ij

M. Ft. pil. 1.
S. Take at bedtime.

Or

℞ Fl. ext. cascaræ sagradæ (aromat.)
S. Thirty to sixty drops at bedtime.

Little pills of aloin are valuable in some cases.

℞ Aloin	gr. $\frac{1}{6}$
Strych. sulph.	gr. $\frac{1}{40}$
Ext. bellad.	gr. $\frac{1}{10}$

M. et ft. pil. 1.
S. Take at bedtime.

A small dose of podophyllin, half a grain or less, may be added to the last prescription, if desired.

For patients who insist upon regulating themselves with drugs, the whole gamut of the pharmacopeia may be run, for no one remedy or prescription does service week after week. For such I mention the following:

Rhubarb, in the form of the following prescription:

℞ Pulv. rhei.	gr. $1\frac{1}{2}$
Sod. bicarb.	gr. $1\frac{1}{2}$
Oil peppermint	gr. $\frac{1}{10}$

M. et ft. pil. 1.
S. Take at bedtime.

Aloes soc., one-half of a grain, and the extract of nux vomica, one-sixth of a grain, may be added.

Podophyllin resin in pills containing one-twentieth of a grain, and compound liquorice powder, in doses of from one to three teaspoonfuls or in the form of compressed tablets, are good remedies. Calomel is the best remedy for an occasional unloading, say once in ten days. A single dose of three to five grains may be given at night followed by a saline (Rochelle salts, two drachms) in the morning. Asafoetida with capsicum is said by Anders to be of benefit in senile atrophy with flatulence. A skilful old practitioner whom I knew when I was a boy prided himself on a mixture of this kind:

℞ Magnes. sulph.	ʒj
Magnes. carb.	ʒss.
Inf. gent. comp.	ʒss.
Aq. menth. pip.	ʒjss.

M. S. Shake well and take at bedtime.

The advantage of this prescription is that there is no danger of the patient becoming the devotee of a drug.

A good laxative for children is the following formula:

℞ Pulv. rhei.	gr. $\frac{1}{10}$
Sulphur	gr. $\frac{1}{5}$
Sod. phos. exsic.	gr. 1
Ol. menth. pip.	♏ $\frac{1}{20}$

M. et ft. pil. 1.
S. Take at bedtime.

Senna leaves cooked with prunes or figs and made into a paste is readily taken by children and is effective.

Massage of the abdominal muscles is one of the best means at our disposal, especially in cases where outdoor exercise is deficient. A metal ball covered with leather, and weighing four to six pounds, may be rolled over the abdomen every morning for five to ten minutes to stimulate peristalsis. The simplest of all adjuvants are the natural mineral waters: Friedrichshall, Apenta, Hunyadi, Carlsbad salts, a teaspoonful in a glass of water every morning.

If the constipation is of long standing, it is well to give a laxative, followed in six or eight hours by an enema, and then to repeat the laxative on one or two successive days in order to insure a complete evacuation of the lower intestinal tract. In this manner the sluggish bowel is often compelled to yield up the accumulation of weeks, to the utter astonishment of the patient and often of the physician as well. Such a course is imperative in preparing for any gynecological operation. If it is neglected, the surgeon may have occasion for anxiety for several days after the operation, until the bowels begin to move, and then there is often a regular dêbacle, with reports of one or two bedpans filled with the malodorous materials, when the depression vanishes, the temperature and pulse drop, and the facies change from a sallow pinched expression to a natural one.

In the preparation for operations upon complete laceration of the perineum and sphincter ani, it is my custom to give compound liquorice powder in doses of three to six teaspoonfuls.

Enemata.—These are perhaps the simplest and safest means of unloading the bowel and avoiding drugs. In cases where the extreme lower bowel is habitually loaded and there seems to be a lack of expulsive power, I find it efficacious to inject from two to six ounces of warm sweet oil, passed slowly in with a soft catheter at a slight elevation at bedtime. It ought to act naturally the next morning. A glycerin suppository is sometimes efficacious in the same way. Large enemata of warm sweet oil from a half to one pint, introduced slowly and gently, have been used in Germany with success. The action here is upon the upper colon as well as the lower bowel. Sweet oil taken freely by the mouth at meals with food, or taken deliberately as a laxative (tablespoonful) at meal times has corrected the habit in some instances.

Of the watery enemata the flaxseed enema is the best. I make it by taking two tablespoonfuls of flaxseed to a pint of cold water, boiling it for ten minutes, and then straining out the seeds. The whole should be injected while still warm (not hot!), and should be of a mucilaginous consistency. A simple emulsion is made of cotton-seed oil, with enough soap and warm water to make up a pint. A satisfactory purgative enema is composed of sulphate of magnesia (Epsom salts) four ounces, glycerin two ounces, turpentine two drachms, and warm water four ounces. This enema is always effectual, but it may be exhausting to a weak patient. I often use it without the turpentine.

Caution: A too frequent use of large enemata may distend the lower bowel, cause loss of tone, and so increase the difficulty it is attempting to overcome.

When the constipation is associated with torpidity of the liver, small doses of calomel must be given from time to time, followed by a saline. A broken dose of calomel, consisting of one-eighth of a grain given every half hour for eight doses, is the best way to administer it, with a glass of Apenta water next morning.

In all obstinate constipation coming on in middle life, bear in mind the possibility of malignant disease of the intestine, or the pressure from pelvic tumors, or a stricture; these can be detected by a local examination either with the finger or with one of Kelly's proctoscopes.

In a woman who has borne children and in whom the vaginal outlet is lax and gaping, a pouting and eversion of the vaginal walls, especially the posterior wall (rectocele), is often seen, if the patient is told to press down. In these cases a suitable operation repairing the outlet often does much to relieve the difficulty of evacuation by restoring the muscular and tendinous structures, so that the pressure in the act of defecation is no longer lost in the vagina, but acts instead on the rectal sphincter.

The care of the bowels immediately after abdominal operations is a matter for much care and decision, and as it sometimes happens that this duty is left to the lot of the physician in charge of the case by the operator, I give some general directions in regard to it. If the bowels are thoroughly moved, as they should be, before the operation is performed, they need not act again until the second, or even the third day. This first action is best accomplished by means of the flaxseed enema described above, and when the bowels have been once opened, there should then be an action every twenty-four hours. A special enema, which I have found useful in some cases, is composed of cotton-seed oil, four ounces, glycerin, two ounces, turpentine, two drachms, and enough soap and water to make up a pint. For distention with constipation following operations I have found milk of asafoetida, four to eight ounces, used warm, very effectual. As no exercise can be taken, some form of assistance may be necessary to keep the bowels open each day. Cascara is the best drug for this purpose, but it may be made a general rule that large doses of a laxative medicine should never be given to a patient lying on her back and obliged to evacuate the bowels in that position. Unless a mild dose of cascara (forty to sixty drops of the aromatized fluid extract) is sufficient, it is best to continue the flaxseed enemata as long as the patient remains in bed.

Sänger, who has been largely followed in his own country, lays great stress on some such plan of procedure as the following: In the first place, the working principle is to wean the patient as soon as possible from all drugs. To do this it is necessary to win her confidence completely, both as to the importance of the undertaking and the ability of the physician to effect a cure. At first a few drugs are used to tide over the difficult period of breaking off, but later even these are given up absolutely, until finally nothing but a little belladonna is used, and that only occasionally. Cascara, Sänger considers no better than any other purgative. After giving up laxatives in this way a period of persistent constipation follows, which may last for eight days or longer. This should be explained to the patient beforehand, and she should be assured that nature will, in time, take care of the difficulty. Sänger uses no special diet, declaring that "no diet is the best diet." It is, however, important to see that several glasses of water are taken daily, or else whey, buttermilk, or sour milk. Fresh and cooked fruits are used as well as coarse bread. In addition to this an attempt at regularity of habit is enforced. Most important is some daily active exercise, especially in the gymnasium. Injections are used to as limited an extent as possible; and purgative mineral waters are rejected (*ich halte dieselben* (*Brunnencuren*) *geradezu für werthlos*). Most important of all methods in the treatment is the massage of the abdomen associated with the use of electricity, especially in lax abdomens.

This plan has proved successful in the hands of one of the most eminent gynecologists Germany has yet produced. I give it again here in outline:

1. No medicines except a little belladonna occasionally.
2. Let the patient remain constipated, if necessary, for over a week.
3. In the meantime use ordinary diet with the addition of fruits.
4. See that she takes plenty of water between meals.
5. See to it that some active exercise is taken.
6. Use abdominal massage.
7. Use abdominal electricity.
8. Encourage in the meantime a regular habit by waiting upon nature at a fixed time.

By these simple means an obstinate constipation habit may be overcome.

HEADACHE.

Headache is perhaps the commonest of all the ills that flesh is heir to. It is, indeed, an ailment so frequent that, as a rule, it arouses no attention nor does it excite any solicitude as to the welfare of the patient. Nevertheless, headaches, to those who suffer from them, are an aggravating and distressing disorder, often robbing life of its zest and sweetness and liable at any time to interfere with plans of enjoyment or occupation. Repeatedly recurring headaches are peculiarly hard to bear, and, if not relieved, may render life a burden.

A headache is nothing more or less than a symptom, which often leads up through a tangled skein to some remote and unexpected disorder. Persistent headaches, however, are often most difficult to relieve, so that the sufferer goes from one physician to another, tries all manner of patent medicines, and, as a rule, sooner or later consults a variety of specialists to see if some master in his own department cannot detect an abnormality which is the cause of the continued pain. After the general practitioner, the stomach specialist may be consulted, and he, finding a trifling subacidity, prescribes hydrochloric acid; this fails to bring relief, and as the patient hears of some brilliant cures wrought by the oculists, she goes to the nearest one of repute, who finds a mild astigmatism and prescribes glasses, which also fail to relieve. She then consults a gynecologist, feeling sure that the secret of the recurring suffering must lie concealed in those mysterious pelvic organs which control the cycles of her life from childhood to old age. The gynecologist, in turn, finds a slight uterine deviation from the normal, and puts in a pessary, after which she is either resigned to her fate, or becomes addicted to morphin, or some of the many dangerous patent medicines, advertised with superb impudence not to kill but to relieve suffering. It is because so many of these patients with headaches apply sooner or later to the gynecologist, that I have felt it important to say a few words upon the subject.

Frequency.—I have investigated the frequency with which headaches occur in connection with pelvic and abdominal disorders, by going over five hundred entries in my case-books, and I find that one hundred and seven of the five hundred suffered from headache of one kind or another, in different degrees of severity; in thirty-two cases, the headaches were associated with the menstrual period.

Etiology.—He who would treat headaches successfully, must in every case look deeper than the throbbing, aching head, and search for the underlying cause or causes. Indeed, it is chiefly in this way that the intelligent and trained practitioner differs from the quacks who advertise their nostrums in the daily papers. While the practitioner investigates and removes causes and so often cures the ailment, the parasite upon the profession treats all cases alike, considers headache a disease *per se*, and for the sake of his ten or twenty cents' gain supplies a remedy which he swears will cure the malady, in reality giving temporary relief only by benumbing the brain. This he does even at the risk of life itself, without any conscience at all, trusting to the lax administration of our criminal laws, if he should be arraigned for murder. The nostrum vender is thus on a par with those brutal savages who waylay and slay their hapless victim for the purpose of stealing so trifling an article as his penknife or a few pennies in his pocket.

In undertaking to treat rationally and successfully the cases of headache which come to me as a gynecologist, I must keep in mind all the various commoner causes of the ailment, lest I make the mistake so often attributed to a specialist, namely, that of seeing only my own little territory, and considering that all humanity's ailments in one way or another must flow from the pelvis.

In treating headaches in women, I note in the first place, that men are relatively free from this affection to a remarkable degree, and that when men do suffer from headaches, they are apt to arise from overindulgence at the table; in such a case the ache of the next day is clearly gastric in its origin. Furthermore, the severe and lasting headaches of men about middle life are sometimes the premonitors of grave organic disorders, as, for example, Bright's disease. I discern from these facts that two forms of toxemia, a transient and a permanent form, are at work, and that it must be the toxic byproducts in the blood which produce the symptom, headache. I note, too, that a whole group of headaches, often seen in women, the nervous headaches, are conspicuously infrequent in men. A little further thought suggests, what is quite certainly true, that the reason for this difference lies in the less active physical and intellectual life of the woman, and at once furnishes valuable ideas as to treatment. If this is true there ought to be less headache among our college women than among those who go out at once into society life.

I think we shall not go far wrong if we classify most of our cases of headaches under one or other of the following headings:

Toxic, those due to ptomaine, or leucomaine poisonings (uric acid, etc.), to fevers, to Bright's disease, constipation, and various intestinal disorders, etc.

Neurasthenic, those associated with the nerve exhaustions, so common in our women to-day.

Vaso-motor, congestive and unilateral headaches, often associated with neurasthenia, but frequently noted, too, in women in robust health.

Anemic, a cry of the brain for food, like the pain in over-tired muscles. The headaches of children at school, while often ocular, are sometimes but the cry of a tired, over-worked, often underfed organ, which ought to lie fallow while the rest of the body is undergoing its evolution towards adult life.

Reflex, from the eye, nose, or frontal sinus.

Hereditary, in cases where often no other cause can be assigned. In migraine it is frequently the only explanation which can be offered.

Brain disease, as in syphilis and meningitis, traumata and brain tumors.

In the investigation of a particular case, the physician must try to trace it up to one of these groups, and then to analyze the particular causes there operative.

The first step is to inquire as to the frequency of the headache, its intensity, its duration, and its relation to the menstrual period. Menstrual headaches are vaso-motor in origin (I do not believe they are toxic); as a rule, the premenstrual form is relieved when the flow appears and the menstrual form when a sufficient flow is established. I have not found any particular association between pelvic affections and the especial variety of headache which occurs on the top of the head; in my experience the sincipital headache is rare.

Patients with nerve exhaustion are apt to suffer from a dull pain or pressure in the back of the head and the upper part of the spine. Intense and persistent headache is one of the commonest symptoms among neurasthenics. Headache due to eyestrain is apt to be frontal in character. Where any symptoms, such, for example, as eye-tire, point to the eye, and where other avenues of inquiry have been exhausted, it is always well to call upon a competent ophthalmologist for his opinion.

Nasal polyps may give the first evidence of their presence in the severe headaches they provoke. A little difficulty in breathing, especially if it is marked at the time of the headache, should call for an examination of the upper respiratory passages. Frontal sinus disease may in like manner occasion intense pain in the head with local and supra-orbital tenderness.

It must never be forgotten that headache is sometimes a marked symptom of malaria, or of typhoid fever in its incipiency; such cases are occasionally seen in the wards of a large hospital. A routine examination of the blood is of great service in such instances. Anemia is sometimes the self-evident cause of headache, particularly in women who have lost much blood by uterine hemorrhages. Many grades of anemia can only be recognized by the hemaglobinometer, an instrument so simple that it ought to be in the hands of every practitioner advanced enough to consider it important to use a thermometer in his daily practice.

In severe nocturnal headaches, syphilis must always be looked for.

In the headache of Bright's disease the increase of arterial tension is often evident in the hard bounding pulse; the tension is easily measured with one of the simple mercury pressure instruments connected with a constricting band on the arm (the Riva-Rocci, or one of its derivatives).

Some patients date their severe headaches from an over-exposure to the heat of the sun (insolation), producing a profound vaso-motor disturbance, after which the least exposure or fatigue serves to bring on a violent attack.

In reviewing the history in a puzzling case, heredity must receive close attention, as it may be the only assignable cause. Dr. Ira J. Prouty, of Keene, N. H., tells me the case of a professor in a college, who graduated in medicine and then had to give up the idea of practising, because he suffered, as did his father before him, from severe headaches every two weeks. I find it always well, too, to inquire as to any severe trauma to the head, received perhaps in childhood, and in case there is such a history, to ask the opinion of a good nerve specialist.

Habits of food and habits of drinking must be looked into, especially the latter in these days. Many headaches are alcoholic and grow worse as the patient continues to imbibe the poison. With men, tobacco is a potent cause and in certain ranks of society to-day, this factor needs consideration in treating women.

After reviewing in this manner the various possible causes of headaches, and excluding any possible unusual cause, the physician can settle down to a minute and careful investigation of those causes which are most commonly operative in women, one or more of which is usually at work in any given case.

Auto-intoxication from the gastro-intestinal tract due to fermentation of food must always be thought of and eliminated by questioning, or, if there is any doubt, it must be settled by washing out the stomach and analyzing its contents. The question of fermentation in the tract lower down must always be considered. This is most apt to be noticed after operations, when it often simulates an incipient peritonitis.

Constipation is perhaps the most fruitful of all causes of headache, and it is all the more insidious because women become so habituated to the condition of sluggish bowels, that they fail to realize the importance of its bearing upon their general health. A vaginal examination often reveals a fulness of the bowel, surprising to the patient who " has just had an action." The finger feels a bolus through the posterior vaginal wall, and often there are a number of tender masses (scybalæ) above the vault which may mislead a neophyte into proposing an abdominal operation.

Potent among the causes of headache in women is domestic infelicity. An unfaithful or an unkind husband works like a carking care on the nervous system, robbing life of all its spontaneity and joy. The poor victim gives up her friends, she soon ceases to take any active exercise, and mopes about the house; feeble appetite, indigestion, and anemia follow, and the foundation is well laid for regularly recurring severe headaches.

The late Frances Power Cobbe has given an able description of this form of headache in an article entitled " The Little Health of Ladies " (*Littell's Living Age*, Feb. 2, 1878). " It is many years," she says, " since, in my early youth, I was struck by a singular coincidence. Several of my married acquaintances were liable to a peculiar sort of headache. They were obliged, owing to these distressing attacks, to remain very frequently in bed at breakfast time and later in the day to lie on the sofa with darkened blinds and a considerable exhibition of eau-de-cologne. A singular immunity from the seizures seemed to be enjoyed when any pleasant society was expected or their husbands happened to be in a different part of the country. By degrees, putting my little observations together, I came in my own mind to call these the 'bad husband headaches,' and I have since seen no reason to alter my diagnosis. On the contrary, I am of opinion that an incalculable amount of female invalidism arises from nothing but the depressing influence of an unhappy home. Sometimes, of course, it is positive unkindness and cruelty that the poor creatures endure. Much more often it is the mere lack of affection and care and tenderness for which they pine as sickly plants for sunshine. Sometimes it is the oppression of an iron will over them which bruises their pleasant fancies, and lops off their innocent whims till there is no sap left in them to bud or blossom any more. Not seldom the misery comes from frequent storms in the household atmosphere—for which the woman is probably as often to blame as her companion, but from which she suffers doubly, since, when they have passed, he goes out to his field or his merchandise, with what spirits he can muster, poor fellow, while she sits wherever the blighting words fell on her to feel all their bitterness. . . . To those who can get up and walk away the importance which she attaches to them seems inexplicable."

In some cases, however, the fault lies in a self-centered or evil disposition with outbreaks of bad temper and tantrums, or long periods of sullen brooding over fancied wrongs. One of the most distressing forms of headache is that induced by constant weeping.

The wise physician who is the friend of the patient, as well as her medical adviser, will always in puzzling cases squint with one eye in this direction, and will, where his advice is called for, treat the moral as well as the physical ailments of the family.

Is the patient a neurasthenic? If she is, the physician must expect headache as one of the expressions of the deficient nerve capital.

In addition to the headaches just enumerated we have the simple nervous headache and the sick headache, or migraine. Various explanations have been given of the latter, but none are satisfactory. Edward Liveing, who has written exhaustively on the subject, considered the attacks to be nerve storms nearly related to epilepsy, that is to say, a form of periodic discharge from certain sensory centres: a picturesque way of summarizing the phenomenon, if not an adequate explanation. Observations made by Mangelsdorf of Kissingen show that in every case of migraine there occurs a well-marked acute dilatation of the stomach, and that a frequent repetition of these dilatations leads to a permanent gastric atony. Mangelsdorf claims to find these same dilatations in epileptics during the attacks, which would be another point in evidence of close resemblance between epilepsy and migraine. Other authors regard sick headaches as a vaso-motor neurosis and support this view by the fact that during the attacks the temporal artery on the affected side sometimes becomes hard and firm, as in arteriosclerosis.

There can be no doubt that sick headaches frequently depend upon gastro-intestinal disturbance. W. P. Millspaugh (*South. Calif. Practitioner*, 1907, vol. 22, p. 513) points out that migraine must be distinguished from another class of cases in which headache is frequently occasioned by disturbance of the gastric secretion, whereas in migraine the headache and the gastric disturbance are in all probability due to a common cause, which, according to some persons, is uric acid or one of its near relatives among the incompletely oxidized end-products of nitrogen metabolism. In the former class of cases there is hypersecretion of gastric juices, while in migraine the secretion is diminished. In ordinary hyperchlorhydria the correction of the hyperacidity will often, according to Millspaugh, relieve the headache, and he suggests that such headaches may be reflex from the irritation of the stomach induced by the excess of hydrochloric acid. In some of the cases of the kind coming under his own observation, however, he was inclined to suspect that the alkalis used to correct the acidity were effective by checking a gouty poison which might have been the real cause of the whole trouble.

Diagnosis.—In undertaking a patient complaining of headache I would, in the first place, distinguish whether the headaches were those incidental to some other well-defined trouble and not, as a rule, intense. If, for example, the patient is anemic from the loss of blood from the uterus, I would expect the symptom, headache, to disappear with the correction of the local disorder. I would place in a different category those intense headaches where the distress in the head overshadows whatever other ailments there may be, and, if I have determined that the case under treatment is one of that kind, devote myself at once to the minute examination of every function of the body to discover the cause.

It would be well to fill in some such outline as the one given on page 212, as a good starting point to clear the way for further investigation.

Usually the diagnosis of a case of headache involves the discovery of a variety of causes, all of which conspire to reduce the health below the average norm, when the headache becomes the natural cry of the brain for more and better nutrition. For example, a nervous, tired, anemic woman enters my office with a dysmenorrhea, or with a descensus and dragging of the pelvic organs, associated with poor appetite, lack of exercise, and sleepless nights; in such a case I expect, as a matter of course, to hear that the patient also has headaches, and in undertaking to treat the general condition and the local pelvic ailment, I expect the headaches to disappear as the health improves.

Treatment.—The treatment of headache is twofold: that designed to give immediate relief; and that looking towards the removal of the cause and the prevention of the recurrence of the pain. It will be well to glance briefly at the kinds of treatment we have at our disposal before taking up the use of the particular remedy in any special case.

1. In the first place there are those remedies which promptly and efficiently remove the temporarily acting cause, as in a toxic headache from gastro-intestinal fermentation. Such a remedy is calomel,

Name *Age* *Married*

Children *Miscarriages*

Menstrual function: regularity *duration* *amount*
pain *relation to headaches?*

Headache *age first noted?*
growing worse? *location of pain?*
character of pain? *average duration?*
what remedies used to relieve?

Associated phenomena?

eyes
flushing of face or pallor
nausea and associated stomach symptoms
character of food taken
digestion
sleep
anemia
urine
other ailments?

amount of exercise?

habit as to bath

character of home life, cheerful?

any evidences of neurasthenia?

any illness from which headaches date?

given in three to eight grain doses, followed by a saline purge, in the form of Rochelle salts, the citrate of magnesia, or Carlsbad salts, some six or eight hours later; the good old blue mass pill, given in doses of six to ten grains, is too much out of vogue. Sometimes, where the table is at fault, emesis and lavage are the best immediate means of giving relief. In milder cases, powders of calomel and soda may be given.

℞ Hyd. chl. mit. .... gr. $\frac{1}{6}$
Sod. bicarb. .... gr. $2\frac{1}{2}$
M. et ft. ch. 1. Mitte tales no. viii.
Sig. Take one powder every half hour until bowels move and head is relieved.

Some persons get better results from a single dose of calomel, two to three or five grains.

2. Then there are the remedies which act by relieving congestion. Such are blood letting, drawing six to eight ounces from the median vein of the forearm; the use of hot baths, hot water being added after the patient gets in, until it is as hot as she can bear; hot mustard hip baths, and hot mustard foot baths, putting about a tablespoonful of Coleman's ground mustard to the gallon of water. The amount of mustard must depend a little on the sensitiveness of the patient's skin.

Counter-irritation over the upper part of the spine is sometimes a great relief. A mustard plaster may be tried, or chloroform liniment laid on flannel and held close over the upper cervical vertebræ as long as it can be borne. I have known a case in which great relief was experienced from painting the upper part of the spine with the tincture of iodine. In some forms of nervous headache, when the face is flushed and the temples throbbing, an ice-bag over the occiput or the frontal region is more beneficial, or cold compresses, made by holding wet towels on ice and laying them around the head from time to time.

3. Remedies which act by toning up the nervous system. Here first and foremost come hygienic measures, such as the morning cold plunge, with lively friction to the skin; massage; electricity, either applied generally, or to the scalp during a headache. Gentle frictions to the scalp often exercise a sedative influence, lessening or dissipating the pain. A high-frequency current in the form of a brush discharge, and the wave current of static electricity are much used as a general nerve tonic in the intervals.

4. Hygienic Means.—Regular exercise in the fresh air, particularly breathing exercises, expanding the chest and quickening the circulation. If the patient is not weak, it is well to exercise to the sweating point, then to take a cold sponge, and rest for half an hour to an hour. It is important for patients needing hygienic treatment to sleep in a room with open

windows, or, if possible, in the outside air on a verandah, both winter and summer.

Room exercises, if no other are available, are invaluable, especially those which strengthen the abdominal muscles, and thus aid both by giving support to the abdominal viscera and by relieving venous stasis in the abdomen. For example, on awaking in the morning, while lying flat on the bed, raising the body slowly to a perpendicular attitude about twenty times a minute without any aid from the arms; or raising both legs to a perpendicular position, while the body remains horizontal. Raising one leg at a time only exercises the psoas and iliacus muscles, but raising both feet brings the abdominal muscles into play. Again, standing erect and bending forward with stiff legs, until both hands, arms extended, are brought as near the floor as possible, and then rising slowly again, strengthens the back muscles, completing the circle of the body cavity.

The physician must exercise discretion, however, in ordering systematic exercises, and in using such remedies as tend to stimulate the processes of health by shocking the surface, as the cold bath; he must not prescribe a nerve-exhausting routine of this sort for a jaded woman with no latent powers of response. To do this is as wise as it is to whip a fagged-out horse.

A regular system of hydrotherapy, such as can be found on the Continent of Europe, and in some of our more advanced institutions, is often of the utmost value.

Associated with this hygienic regimen, it is well to use bitter tonics. One of the best of these is nux vomica in increasing doses, beginning with ten drops in water three times a day, and increasing the amount by one drop at each dose until the patient is taking twenty to twenty-five drops three times daily. If there is any twitching of the muscles or stiffness of the jaws, the remedy must be discontinued, and when resumed, the dose must be fixed below the amount which was given before. Strychnin often works admirably and better than nux, given in pilules, containing each one-thirtieth of a grain, increasing the dose rapidly until one-tenth of a grain is being taken three times a day.

For a patient who has headaches often and is below par, Dr. I. J. Prouty often gives:

℞ Ammon. bromid.	gr. v
Tr. nux vomica	♏ x
Elix. simpl.	ʒj

M. S. Take in water after meals; the nux should be increased from time to time until twenty to twenty-five drops are taken each time.

5. Prevention should be written in large letters and hung on the walls of every consulting room, and prevention and hygienic measures walk well hand in hand. By prevention I mean such a careful inquiry into the gen-

eral condition and the habits of the patient, both as to exercise, hours of sleep, character of amusements, reading, and, above all, diet, as shall elucidate the probable causes at work in causing the headaches. It may be, especially in thoughtless young persons, that late hours, and unhealthy, exciting reading are at fault; it may be that the day is all spent indoors, ending up with the theatre or a hot ballroom. Most frequently, however, the fault is dietary; sometimes the capricious appetite craves only highly seasoned food and pastry, with strong black coffee or tea several times a day. In all these things to know is to act, and to effect a cure, a word to the wise is ever sufficient.

Where the suffering arises from anemia of the brain, it is sufficient to check the flow of blood which is causing it, or to restore the normal corpuscular balance of the blood to cure the headache. Iron is indicated in most cases of headache accompanied by anemia and may be given in any of the various preparations already discussed (see Chap. VI, p. 142). In some instances, however, the pain is increased by iron, and it is best to substitute arsenic (see Chap. VI, p. 143) or cod-liver oil. I have found that the use of a large electric light (thirty-two candle power), "thermal electric light," in a parabolic reflector, applied to the side of the head and the back of the neck is of value, but possibly suggestion plays a more or less important rôle here.

6. Remedies which act upon arterial tension.—In all cases with high blood pressure, as evidenced by the full bounding pulse, the bromides of soda, of potash, and of magnesia, given in doses of ten grains or more, in one to two teaspoonfuls of simple elixir every hour until the pain is relieved, are of the utmost service. Nitroglycerin in doses of one-hundredth of a grain every few hours, as occasion arises, is of inestimable value, especially in the old, whose arteries are in bad condition. But the best of all remedies in such cases is the nitrite of soda in half-grain doses, three times a day, continued as long as the tension remains high; it is particularly valuable where there is a sort of status of headache. Marked disturbances of the circulation are sometimes seen after serious operations, with high pressure and headache. The sodium nitrite is invaluable here. On the other hand, in cases of headache where the arterial tension is low, ergotin in doses of one-fourth of a grain, increased up to one grain if necessary, three times a day, is of great value.

In the headaches of pregnancy, the bromides are most useful, associated with diuretics and mild purgatives.

7. Remedies which remove the cause, when that is intracranial or circulatory.—The iodide of potash in syphilitic headache is the great specific remedy of this class. No social status lies beyond the pale of this disease, and the drug is always worth trying in intense persisting headache with visual symptoms, when other remedies fail. The tolerance of the drug may prove to be the only diagnostic factor discoverable.

Quinine in malarial headache is similarly valuable. If the case is a frank one, the remedy may be tried in doses of five to ten grains, three times a day, watching its effect and stopping it, if there is any buzzing or roaring in the ears. Quinine is sometimes of value in headache where no malarial element exists; in such cases it is supposed to act by raising blood pressure.

In rheumatic headache, the uric acid diathesis which underlies it demands a course of appropriate treatment, for which I must refer to the text-books on general medicine. Lauder Brunton recommends:

℞ Pot. bromidi	gr. xv
Sod. salicylat.	gr. v

M. et ft. charta.

Instead of the salicylate, aspirin may be used in doses of six to seven grains, repeated every two to three hours, during an attack.

Trepanation, excision of a scar, of an area of fracture, or of a spiculated bone pressing on the brain is a brilliant remedy, but one which is successful in too small a percentage of cases, even where the indications for it seem to exist, to justify its being advised with assurance; a well-defined hope is all that can be held out. The same thing may be said in regard to the removal of the ganglion of the fifth nerve for intense one-sided headache. In cases of this kind only a competent neurologist can decide as to the probability of relief by this means.

Remedies which act through a mild sedative effect or by inducing sleep are invaluable when the pain is unbearable, but, unfortunately, though brilliantly successful in affording relief, they do nothing to effect a cure. First among these is the sulphate of morphin, given hypodermically, in doses of a quarter of a grain, or, in extreme cases, a half. The extract of cannabis indica, one-half to three-quarters of a grain, in pill form, is often of great value. It is not easy, however, to obtain a reliable preparation of this drug; if a good article is found, it is best, as H. C. Wood long since advised, to secure all of it and use that alone. It must always be borne in mind in giving cannabis indica that some individuals have a marked susceptibility to it.

The bromides and chloral belong in this class of remedies, but the latter is a dangerous drug for the patient to take into her own hands. A good prescription for the bromides is:

℞ Ammon. brom.	ʒj
Elix. simpl.	f℥jss.

M. S. Take a tablespoonful and repeat every hour until relieved.

In more severe cases a substantial dose of the bromide must be given and chloral added, according to the following, or some similar prescription:

℞ Sod. brom.	ʒij
Chloral hydrat.	ʒj
Elix. simpl.	f℥jss.

M. S. Take a tablespoonful and repeat in one to two hours if necessary.

Hoffman's anodyne (compound spirits of ether) is a remedy which has often rendered good service in the past, but has been largely abandoned, owing to the difficulty of getting a really good preparation containing the heavy oil of wine. It should be taken in teaspoonful doses in a wineglassful of water.

Last in this group of remedies I mention the coal-tar preparations, valuable when used judiciously, but dangerous in careless hands, that is, in the hands of the patient herself or of the quack advertiser. The cases now and then coming to light before coroners' juries are but a small index of the numerous deaths from this cause to be laid at the door of the quacks. In some cases an idiosyncrasy exists which makes an ordinary dose of any coal-tar preparation dangerous; the heart's action becomes unduly depressed, a fact shown by blueness of the lips and nails, or even of the whole circulation; the cyanosis may be perceptible to others, when the patient herself is unaware of it. There is drowsiness, amounting in severe cases to coma, and if the drug is continued for some time, it induces a nephritis. As I write, I hear of the death of a friend who had taken his mistress to an abortionist in New York City. He had a weak heart and was suffering from a severe headache. The abortion monger gave him a coal-tar ready relief remedy, and in one hour he was dead. This is but one among hundreds of similar cases. Caution spelled in large letters is the warning to place on every coal-tar prescription.

Acetanilid is more dangerous, phenacetin less so. A good prescription is:

℞ Phenacetin or acetanilid	gr. iij–v
Caffein	gr. j
Sod. bicarb.	gr. iij

M. et ft. ch. 1.
S. Take as directed.

The caffein serves to balance the depressing effect of the acetanilid. Some physicians prescribe a dose of whiskey with each dose of acetanilid, but the evils of alcohol are so great that I prefer using aromatic spirits of ammonia in twenty to thirty drop doses in a little water. The aromatic spirits alone in water is an excellent remedy where the stomach is somewhat disturbed. In using coal-tar preparations there always lurks the danger of forming a habit which in the end endangers life by its effects upon the heart.

Migraine or Sick Headache.—I will now devote a little time to the consideration of sick headache and its management. In sick headache, prodromic symptoms are often present; of which the most constant is the sensation of a blinding light. Some patients display marked psychical disturbances, either of excitement or of depression. Dizziness and giddiness are not uncommon precursors; and in the gouty or rheumatic form, the headache is often preceded by stiffness or shooting pains in the joints.

The headache at first is often situated on one side of the head; in some cases it always starts on the same side, while in others it alternates. It generally begins in one spot near the temple, and extends downwards along the affected side, sometimes following, roughly speaking, the course of the fifth nerve and extending to the shoulder and arm. Shortly after the onset of the headache, one of the chief symptoms, nausea, appears, and, as a rule, increases until it ends in violent vomiting and retching, when at first the contents of the stomach are ejected and later bile. In severe attacks, when the retching continues long after the stomach is emptied, it greatly exhausts the patient. Vaso-motor disturbances are also a marked feature of sick headache, the face being at times deadly pale, and at other times a burning red. When the pain is confined to one side, the vaso-motor disturbance is similarly restricted. One peculiar feature attending some sick headaches is an overpowering sense of drowsiness, sometimes so irresistible as to overcome even the severity of the pain and induce heavy sleep in the intervals of vomiting. Sick headaches in women have a marked tendency to appear at the menstrual periods, either before, during, or after menstruation. The duration of the sick headache is usually from twelve to twenty-four hours; they generally leave the patient utterly exhausted. Young women, with strong recuperative powers, recover quickly, but older persons are often incapacitated for several days. As life advances, however, the headaches usually show a tendency to decrease in violence, although there is likely to be a period of great severity about the time of the menopause. After menstruation has ceased, they occur, as a rule, much more rarely.

Treatment.—In sick headache it is useless to give remedies by the mouth during the violence of the attack, for the stomach will not retain them. A hypodermic of morphin is practically the only drug which can give any relief, but it is only in cases of extreme suffering or occasions of special urgency that the physician is justified in resorting to this measure. Under no circumstances must he allow the patient to use the hypodermic syringe herself, for the recurrent nature of the disorder peculiarly favors the formation of a drug habit. Occasionally, a strong mustard plaster over the upper cervical region gives some relief, but, as a rule, when a headache of this kind has once begun, the only thing to be done for the patient is to keep her absolutely quiet in a darkened room, until the violence of the attack has subsided.

A great deal can be done for the relief of such headaches, however, by prophylaxis. Persons subject to them are well aware that the attacks are most frequent if their general health is depreciated, or if they are exposed to unusual excitement or fatigue. When it can be established that they are associated with a gouty or rheumatic constitution, the underlying condition should be treated. Constipation should be especially guarded against, for in many cases the permanent relief of a constipated habit has been followed by permanent relief of the headaches. Not infrequently a torpid liver exists in such cases, and the administration of a small dose of calomel at intervals of about ten days for a period of several months will do much towards relief. A broken dose of one-half to one grain in powders, or tablets of one-eighth of a grain, at intervals of half an hour, followed next morning by a saline purge, is the best form of administration. A wholesome varied diet, plenty of fresh air and exercise, attention to the bowels, and avoidance of over-fatigue and excitement will do a great deal towards reducing the frequency of these headaches. The physician must always bear in mind the fact that headaches of this description are sometimes due to uremic poisoning, and he should never be satisfied to treat a case without assuring himself positively as to the presence or absence of nephritis.

INSOMNIA.

I do not know whether an unusually large percentage of patients with insomnia calls for relief at the consulting rooms of the gynecologist, or whether the world at large is becoming more and more afflicted with this disorder, but of one thing I am sure, that sleeplessness is a distressingly common ailment. With the exception of the neurologist, it probably falls to the lot of the gynecologist to see more insomnia than any other specialist. It behooves him, therefore, not only to pay close attention to those cases which fall peculiarly under his sphere, but, in order that he may intelligently select his cases, to have some clear knowledge of the causes and treatment of insomnia in general. For this reason I give here the conclusions drawn from my personal experiences in this common and most trying malady.

Etiology.—The causes of insomnia are not, as a rule, recondite; they lie in the mode of life, in upbringing, in occupation, in domestic arrangements. Let us review a few of them. In the first place, sleeplessness is peculiarly common among neurasthenics, and whatever produces neurasthenia, conspires to produce insomnia. Some neurasthenics, especially women, are such because of a fundamental defect in the nervous system; others again are acquired neurasthenics through over-exertion. The recognition of these two classes has an important bearing on the prognosis in insomnia.

Constant over-taxation in attending to life's duties without relaxation produces first, a sense of weariness which, as a rule, is neglected; the next symptom is apt to be an insomnia which cannot be so easily overlooked, as it soon begins to interfere seriously with the daily activities of life. Constant, fixed, strained attention to any pursuit produces a fulness in the head which leads to sleeplessness. Continued excitement, vexation, or a great sorrow brings about the same result.

It must also be remembered that a persistent insomnia is sometimes the prodrome of grave nervous disorders. In children, excessive study produces insomnia. Some patients date their insomnia from habits begotten in childhood, practices due to a lack of proper parental control, relative to proper hours of going to bed.

It is always important to inquire as to heredity, as sleeplessness, in a large percentage of cases, is inherited from a maternal or paternal ancestor.

These and kindred causes seem to show that insomnia is kept up by a loss of vaso-motor control, or a vaso-motor exhaustion, resulting in dilatation of the capillaries.

The habit of turning night into day, or as one of my associates puts it, "the habit of pottering around at night," begetting later and later hours, tends to produce a wakefulness which is hard to overcome. One of my friends who acquired an insomnia in this way, found that a small dose of whiskey would give the much needed rest; but the drug soon overmastered the patient, who died a confirmed drunkard. Coffee and tea are responsible for the wakefulness of some patients.

There are different forms of insomnia, namely, the early night, the early morning, and the all night forms. In other, distressing cases, there is fitful sleep or half sleep, when it seems to the patient that she has really been awake all night. Some people think they do not sleep, when in reality they get a number of hours of good rest. A night nurse slipping into the room at intervals through the night will often correct a false impression of this kind; but it is not always well to tell the patient that she has had a good night's rest, as she may resent it.

Treatment.—For practical purposes cases of insomnia may be grouped, I think, under three heads, namely:

1. Cases complicated with some other ailment, in which there is a reasonable hope that upon removal of the complication, the insomnia will disappear.

2. Cases in which the insomnia is associated with symptoms of a pronounced nervous disorder, and is of a more extreme form.

3. Simple, mild insomnia, which may be looked upon as a transient disorder, perhaps associated with some minor ailments in the genital tract, or in the nervous system.

Cases of the first and last groups come continually, and come appropriately to the gynecologist for relief. The distinction between either of these and cases of the second group, however, is sometimes difficult to make, as no hard and fast line can be drawn between cases which are closely linked to the mild neurasthenics on the one hand, or are inseparably connected with a mild pelvic disorder on the other. Sometimes the test of two or three weeks' observation alone will tell. In all doubtful cases, a neurologist ought to be called in to assist in the decision. Bad, inveterate, and malignant neurasthenics do not belong by rights in the gynecologist's hands at all.

The remedies I have found useful and applicable in the milder and intercurrent cases, dissociated from any profound affection of the nervous system, may be grouped as follows:

1. Removal of the cause.
2. Hygienic remedies.
3. Drugs.

1. First and foremost it is necessary to remove any evident cause for the insomnia. A direct cause, as, perhaps, some gross lesion in the pelvis, or, it may be, some hidden cause, acting alone or with some minor pelvic lesion, will conspire to upset the nerve balance and bring about persistent sleeplessness. A local affection, such as a relaxed vaginal outlet, letting the uterus down and permitting the pelvic structures to drag on their attachments, will produce nervous exhaustion, as well as a nagging displaced

kidney. I would then proceed at once to correct these troubles, and would expect the general care, the feeding, the massage, the fresh air, and the sunshine baths, that ought to follow an operation, to relieve the insomnia too. Do not let the patient be impatient about it, however, for the relief may be more positive after she is up on her feet again and able to walk out naturally, taking healthful exercise without the previous drag. She will then grow normally tired and sleep normally afterward.

The first thing then is to operate soon, if the patient needs it, and to work on the insomnia while the other reparative processes are going on, so as to cure the sleeplessness, if possible, *pari passu* with the healing of the wound.

2. Hygienic Means of Relieving Insomnia.—These are by far the most important, indeed they are the sheet anchor of all successful treatment. Hygiene is the purpose of all forms of treatment, whatever they may be. However they may begin, in hygiene they must end, in order to be successful and self-perpetuating. The patient who is better while in the hospital after an operation must be committed with sedulous care to mother Hygeia on leaving. It is not enough for the physician to be able to claim that the wound healed well and the patient slept while she was under his care.

The hygienic means at our disposal are these:

A good bed.
A cool room.
A proper hour for going to bed.
Regulation of the diet.
Cold and hot baths.
Spinal douches.
Cold packs.
Massage.
Electricity.
Empty bowels.

It is not my proper rôle to go minutely into these measures which are more fully described in works on hygiene and general treatment.

Some patients sleep much better on a particular kind of a bed, one on a hard bed, another on a soft cushiony one; and when this is the case, the bed should be provided without thought of economy.

A cool room, temperature sixty degrees Fahrenheit or lower, is conducive to rest; and when it can be arranged, it is a good plan to have the bed, duly sheltered, out of doors. It is a mistake, however, to get into a cold bed and to be kept awake by cold feet. The bed ought to be well warmed in winter, and if the patient cannot sleep well between linen or cotton sheets, soft blankets may be tried. Before going to bed, a hot bath (110° F.) may serve to draw the blood to the skin away from the head and so give an impetus to sleep at the outset. Whenever anything is done to promote sleep before retiring, it is important to see that nothing stimulates thought or turns the attention actively in another direction, after the preventive measure is taken.

I shall not say more about the diet than to indicate that a simple nutritious food is best. Late suppers and such nerve excitants as alcoholic beverages, tea, or coffee should be avoided. It is often of benefit, however, to give the patient a cup of gruel or hot malted milk on retiring, say about two hours after a moderate supper. The fermentation in the stomach imposed by a heavy dinner keeps many persons restless and awake; this must always be looked into.

Whatever may be the difficulty in sleeping, the patient must go to bed at a reasonable hour, say ten o'clock or earlier, and not later than eleven.

Patients who wake up in the night are often helped by taking some food; a glass of milk is the simplest, for it can stand close to the bedside ready for use.

When the patient takes a holiday cure, there is nothing like the activities of a simple camp life and a good rubber air bed in the woods to promote sound refreshing sleep.

The bowels must be kept emptied regularly, as a copremia is often the cause of wakefulness. Massage is a great help for a time, but it is only a temporary expedient, for the most part for the bedridden, as the patient must soon be thrown on her own resources to find natural healthful exercise day by day.

General electricity works in a manner analogous to massage and is a good alternant with it. Sometimes an early night wakefulness is relieved by the application of electricity and a gentle massaging of the scalp.

Of all the remedies for sleeplessness at our command the cold pack is, perhaps, the most generally useful. It is given in this way: The patient is placed upon a rubber sheet with a woolen blanket on top of it. Her nightdress is then taken off while she is kept well covered with a blanket, and she is then turned upon her side. A sheet is wrung out of water at the temperature ordered, which may be anywhere from 100° F. to the temperature at which it runs from the spigot. The sheet must be so folded that the thin edge will be at the outside of the bed. The patient is then rolled in the sheet so that she is entirely enveloped in it, after which the edges of the blanket are brought beneath her, each layer tucked in carefully, and the rubber blanket finally brought over the whole so that her entire body is covered by it. A hot-water bag must be placed at the patient's feet. If she does not warm up promptly, additional blankets may be used. She should remain in the pack for from five to twenty minutes, and when taken out, she must be carefully rolled in a dry blanket and briskly rubbed with a Turkish towel, after which her nightdress is replaced and she is put between sheets again.

Our best neurologists to-day are making large use of hypnotism and suggestion in inducing sleep. To effect anything by this means, the physician must know his patient well enough to inspire confidence and must engage her aid in a common cause, operating against a common enemy, insomnia. The attitude of expectation thus created must be enhanced by the external conditions of the moment, such as retiring at a fixed hour, quieting the mind, and composedly awaiting the advent of the expected guest, sleep.

The worst cases of insomnia must be treated, like bad neurasthenics, by absolute isolation and rest in bed for several weeks or longer, under the charge of one nurse, the patient not even being allowed to hear from a relative or read a letter, much less receive visitors.

What shall I say about the treatment of that most distressing of all forms of wakefulness which springs from a mental distress, when the poor victim, unable, as in the daytime, to escape from her anxiety in many hourly distractions, lies, and thinks, and tosses, and readjusts her circumstances, dwelling, perhaps, on some critical event, in which, if she had acted differently, her distress would have been spared. The true physician will not play the coward here, but will esteem it his highest privilege, according as he has grace given him to intervene, to heal the moral or the family ill, as well as the physical, and so to put the wearied mind at rest. This is the truly difficult side of our labors, far more difficult than any mere laboratory analysis, and for this reason many men, even among those who are accounted great, run away from it incontinently.

Drugs.—I now come to the drug treatment of insomnia, much decried, but everywhere used, and in most cases necessary for a limited time.

The drug is a crutch for the cripple on the road to the house of Hygeia, and sometimes the cripple cannot get there without it; or she gets there much faster for the temporary, judicious, carefully supervised aid of the crutch.

My list of drugs is but a short one: Trional, aspirin, veronal, codein, sulphonal, bromide of potash, chloral. The ideal hypnotic has not, and it is safe to say, never will be found; in fact it would be a misfortune if one were ever discovered, as it would then be used universally and persistently, to the exclusion of the return to natural sleep by the gateway of hygienic methods.

It will be seen upon examining the different drugs on the list that there is not one which can be kept up indefinitely. "For temporary use" ought to be written on the label of the vial containing any one of them. Prescriptions for them ought not to be re-filled except by order of the physician, because of the extreme danger of forming the drug habit, as well as that arising from the pathological effects they may have upon the kidneys or the circulatory system.

Aspirin, in five to ten grain doses, is of use where the insomnia is associated with headache. For wakefulness which occurs as soon as the patient goes to bed, trional, in doses of five to ten grains, is one of the best remedies we have; for wakefulness in the latter part of the night, sulphonal in doses of ten grains is better. I have known the combination of the two to work beautifully.

℞ Trional	gr. v
Sulphonal	gr. vii

M. et ft. charta.
S. Take at bedtime.

It must always be remembered that sulphonal is occasionally extremely injurious to the kidneys, especially if given for a long time.

There is a certain class of patients who go to sleep easily, but cannot stay asleep. With them it is a good plan to give ten grains of sulphonal about four o'clock in the afternoon and ten grains of trional at bedtime. Trional, in some cases, is more effective if given in a suppository containing fifteen grains.

Another excellent remedy is veronal. Five to ten grains is the usual dose, though as much as fifteen grains may be given. Veronal must be watched and stopped if it produces any unpleasant symptoms. The bromide of sodium or of potassium in combination with veronal gives excellent results.

℞ Potass. bromid.	ʒiij
Veronal	gr. xlviii
Elix. simpl.	f℥iij

M. S. Tablespoonful at bedtime.

This combination will give a nervous, overwrought, excited patient a good night's rest when everything else fails. It must always be given in solution, never in powder form, as it has a tendency to irritate the stomach.

In a bad case of insomnia, a combination of bromide and chloral may be used for one or two nights.

℞ Potass. bromid.	gr. xl
Chloral hydrat.	gr. xx
Elix. simpl.	f℥ss.

M. S. Take at bedtime.

Hyoscin hydrobromate, given hypodermically in a dose of one-hundredth to one-sixtieth of a grain, is of value in extremely nervous cases bordering on insanity.

OBESITY.

It is not my intention to do more here than refer to obesity in general and to give briefly in outline such simple facts as ought to be in the possession of the practitioner who undertakes to treat any form of it.

Obesity, corpulence, or an excessive deposit of adipose tissue in the body is a common affection among women, sometimes in association with disorders of the pelvic organs, and so characteristic of married women advancing beyond middle life that it almost constitutes the typical characteristic of the sex at this period. The fat, as a rule, is uniformly deposited in all situations where it is normally present, namely, about the face, the shoulders and arms, the chest, the abdominal walls, within the abdomen, and over the thighs and legs. When the superincumbent fat finds no support below, it falls downwards in transverse folds, creating a double chin, wattles on the back, or great folds across the lower abdomen, hanging over the symphysis. In such patients the specific gravity of the blood is usually increased and, as a rule, the percentage of hemoglobin, creating a plethora. The most serious complication, however, is extensive deposits of fat about the heart and in the intermuscular interstices, by which the organ itself is literally smothered; even the coats of the arteries are sometimes affected.

Etiology.—Heredity is a strong predisposing cause in obesity and is sometimes the only one which can be assigned. Anders (" Practice of Medicine," 1900, p. 1226) noted that out of two hundred and two cases of obesity in his practice heredity was distinctly traceable in sixty per cent; in fourteen cases out of the number it had existed from childhood. Gout and rheumatism are factors in a good many cases. Fibroid tumors are often accompanied by an increase in weight, while ovarian troubles are associated with a tendency to emaciation. In some cases of anemia or chlorosis the patient gains flesh from the non-oxidation of food.

Amenorrhea is often accompanied by obesity and under these circumstances the gain in flesh is often extremely rapid, it may be as much as fifty or sixty pounds in the course of a few months (see Chap. VI). The establishment of the menopause, as is well known, is accompanied, in the majority of cases, by an increase in weight, and the same thing is observed to follow the removal of the ovaries before their functional activity is complete. Exactly what governs the increase of adipose tissue in the three latter classes of cases is not known; the most we can say is that with the disappearance of the ovarian function and the glandular corpora lutea the tendency to take on flesh, which has up to that time been held in abeyance, gains the upper hand; this is especially apparent in the Jewish race.

Symptoms.—The symptoms of excessive adipose tissue (polysarcia) are: indisposition to engage in active pursuits, or even to walk or take the most moderate exertion; breathlessness on moderate exertion; plethora, as shown by the frequent flushing of the face, increased by exertion and often ending in dizziness. In young women, the rapid taking on of fat is marked, as a rule, by the lessening of the menstrual flow, which may even cease altogether for months or years—this form of amenorrhea is commonly associated with sterility.

Treatment.—The first step to be taken in the treatment of obesity is to ascertain the cause and, if possible, remove it. If the patient gives a history of gout she must be put upon a proper regimen for it. In anemia and chlorosis the administration of iron, arsenic, and cod-liver oil is often accompanied by a decrease in weight instead of a gain, as in other affections, for example, tuberculosis. The obesity associated with amenorrhea is dependent upon the underlying condition which occasions the suppression of menstruation, and, as a rule, can only be successfully dealt with through it. In such cases I always try lutein tablets, five grains each, made from the dried corpora lutea of swine, given three times a day. In some cases they are followed by excellent results.

In the obesity of women approaching or past the menopause the following lines of treatment are of value: When the patient is a large eater the amount of food must be cut down; and with the lessened ingestion of food the patient will do well to spend more time in the thorough mastication or "insalivation" of what she takes. Most women over forty take more food habitually than is at all necessary at a period of life when the activities of growth and of child-bearing are at an end. Unfortunately, those women who consult the gynecologist on account of excessive fat are generally troubled with the affection in its less distressing forms, and they are, as a rule, unwilling to take any trouble or practice any self-denial to lessen their weight, least of all to modify their habits of life. If, however, the patient is disposed to take her condition seriously and to regulate her life each day so as to reduce her weight, a regular course of treatment should be prescribed, during which she must be under medical supervision both as to the effect as tested by the scales and as regards her general health. Before prescribing such a course of treatment the physician should make out an outline of the patient's history and of the line of treatment proposed. I give the following outline as a suggestion:

Name.
Age.
Number of children, if married.
Menstruation, as regards regularity and amount.
Menopause.
Present weight.
Increase in weight over usual amount.
Rapidity of increase.
Symptoms associated with increase in weight.

Food, amount, character, regularity of meals, amount eaten between regular meals. Write out a description of average meals, breakfast, dinner, supper or lunch.
Water, amount taken.
Alcoholic beverages.
Amount of exercise taken and nature.
Any mental peculiarities, especially sluggishness suggesting myxedema.

With these data before him as a working basis, the physician should underline the prominent factors in the case, such as menopause; amenorrhea; increase in weight within three years; much fat and starch in ordinary diet; excessive amount of water taken; exercise only about the house.

The physician must then proceed to treat each case according to ideas suggested by prominent facts brought out in this investigation. The following general principles are always to be borne in mind:

It is necessary to promote the oxidation of fat in the system and prevent the ingestion of new supplies; in order to accomplish this the amount of fat-forming foods must be limited, while the amount of exercise and other factors increasing fat destruction must be increased. In the first place it is well to diminish the total quantity of food. The average diet for an adult is one hundred and twenty-five grammes of albumen, eighty of fat, and three hundred and fifty of starch. In attempting the reduction of obesity the albuminoids must be diminished least and the fats and starches to a much greater degree. Most cases of obesity would improve on one hundred and twenty-five grammes, or more, of albumen, forty of fat, and one hundred and fifty, or even less, of starch. It is wisest, however, to reach this amount of reduction by degrees. In the later stages of the treatment, when considerable amounts of tissue have been lost, the non-nitrogenous foods should be increased, so that the albuminous tissues of the body do not become wasted. The treatment must be kept up for weeks or months as the case requires, and the cure must not be considered complete until the weight is brought down to what is normal for age, size, and sex. A rapid loss of weight at the beginning of the treatment is not desirable; two to three pounds a week is much better for the patient than a larger amount.

If any benefit is to be derived from the treatment, the physician must insist upon its being conscientiously carried out and the patient must be willing to comply with the directions. Where compliance with directions is difficult or impossible at home, it is an excellent plan to send her to some Spa, such as Carlsbad, Marienbad, or in this country, to the Hot Springs of Virginia.

The following diet list for obesity is taken from Friedenwald and Rurah ("Diet in Health and Disease," 1905):

GENERAL RULES FOR OBESITY.

"Guard against sugars, starches, and excess of fat-forming foods. A certain amount of fat with the food is essential. Let beginning impairment of the patient's strength be the sign to give more liberal diet. Diminish fluids, especially at meals, when not more than five ounces should be given. May substitute saccharin for sugar.

May take:

Soups (very little, if any).—Chicken broth, oyster soup, clam broth, thin beef-tea.

Fish.—All kinds except salt varieties, salmon, or bluefish.

Meats.—Once a day only; lean beef, mutton, chicken, game, veal.

Eggs.—Boiled and poached.

Farinaceous.—A limited amount of dry toast, aërated bread, shredded wheat biscuit, gluten biscuits, beaten biscuits, zwieback, Vienna rolls, soup-sticks, crusts, Graham gems, hoe-cakes.

Vegetables (fresh).—Asparagus, celery, cresses, cauliflower, greens, spinach, lettuce, white cabbage, tomatoes, string-beans, stuffed peppers, radishes, very little if any potatoes.

Dessert.—Cheese, grapes, oranges, cherries, lemons, currants, apples, peaches, berries, acid fruits, roasted fruits (little sugar).

Beverages.—Limited quantity of water, buttermilk, tea, coffee (no sugar or milk), light wine diluted with Vichy. Mineral waters.—Avon Springs, Richfield Springs, Crab Orchard, Londonderry Lithia, Hunyadi, Carlsbad, Friedrichshall, Rubinat, Puellna, Villacabras. Continue for several weeks drinking one glass of Kissingen water thirty minutes after each meal one day, and one glass of Vichy water similarly the next. May use artificial compounds.

Must avoid:

Fats in excess, beverages in excess, thick soups, salmon, bluefish, eels, herrings, and all salt fish, pork, sausages, spices, hominy, oatmeal, macaroni, potatoes, parsnips, turnips, carrots, beet-root, rice, watermelons, muskmelons, puddings, pies, cakes, sweets, milk, sugar, malt and spirituous liquors.

I also give another dietary taken from Anders (*loc. cit.*), which illustrates what may be ordered in individual cases:

Morning Meal.—Fine wheat bread, 1¼ ounces; a soft-boiled egg; milk, 1 ounce; sugar, 77 grains; coffee, 4¼ ounces.

Noon Meal.—Soup, 3 ounces; fish, 3 ounces; roast or boiled beef, veal, game, or poultry, 6 to 8 ounces; green vegetables, 1½ ounces; bread, 1 ounce; fruit, 3 or 4 ounces; no liquid (or only 4 or 5 ounces—120.0–148.0 c.c. of very light wine).

Afternoon Meal.—Sugar, 77 grains; coffee, 4 ounces; milk, 1 ounce; occasionally bread, 1 ounce.

Evening Meal.—Caviar, $\frac{1}{3}$ ounce; one or two soft-boiled eggs; beefsteak, fowl, or game, 5 ounces; salad, 1 ounce; cheese, 1 drachm; bread, rye or bran, $\frac{1}{2}$ ounce; fruit or water, 4 to 5 ounces.

Should there be a history of gout or of rheumatism, a course of diet specially applicable must be made out.

A good deal can be done in the way of prophylaxis during childhood in cases where the family history shows that obesity is likely to occur at maturity. In such cases careful attention must be paid to appropriate exercise, systematic daily cold baths, fresh air, and the reduction of fats and farinaceous food.

There has been much talk of late years of the extract of the thyroid gland in the reduction of obesity. In cases of myxedema it is known to be of great value and there are certain doubtful cases, where no symptom of myxedema exists except mental sluggishness, in which small doses of the thyroid, say two grains three times a day, have a remarkable effect. It is always allowable to try the gland in such cases, keeping the patient under careful observation, but should there be any indications of injurious effects, manifested by tachycardia, or irregular heart action, suffusion of the face, syncope, vertigo, or marked headache, it must be stopped at once. The indiscriminate use of the thyroid in any and every case of obesity is extremely dangerous and ought not to be encouraged, as it acts as a depressant and also causes gastro-intestinal disturbance.

In conclusion mention may be made of the four principal methods of reduction of obesity, namely, those of Banting, Von Noorden, Oertel, and Ebstein. The distinguishing characteristics of these are:

Banting reduces the amount of farinaceous food, depending almost entirely upon proteids. Von Noorden reduces the amount of food as a whole, giving a large proportion of meat and restricting the amount of sugar and starches; the amount of liquids is also reduced. Oertel's treatment is based largely upon the reduction of liquids to as small amount as can be borne; the diet allows rather more carbohydrate and fatty food than that of Banting and rather less than that of Ebstein. Oertel carefully includes the use of graduated exercises in his course of treatment. Ebstein gives less proteids than Banting, but more fat and carbohydrates, in fact, he allows a greater proportion of fat than is found in any other dietary.

ADIPOSIS DOLOROSA.

This affection, otherwise known as Dercum's disease, is characterized by the deposit of fat in masses situated in different parts of the body, preceded and attended by pain. It is an affection peculiar to women and appears during the middle period of life. Neuralgic pains associated with the fatty masses occur in different parts of the body. Sometimes the fatty deposits become so large that they form huge pendulous masses; these never appear on the hands or feet. This affection differs from other varieties of obesity by the pain associated with it and by the irregular distribution of the fat. In some cases of the affection the thyroid gland has shown a marked tendency to atrophy. Dercum states that he has seen great improvement from the use of the thyroid extract in the treatment of the disease.

CHAPTER IX.

BACKACHE. COCCYGODYNIA.

(1) Backache: Frequency, p. 232. Etiology, p. 233. Treatment, p. 238.
(2) Coccygodynia: Definition, p. 242. Early cases, p. 242. Etiology, p. 243. Symptoms, p. 244. Diagnosis, p. 245. Treatment, p. 245.

BACKACHE.

Frequency.—Backache is one of the commonest disorders to which women are heirs. Pain in the back is not often felt by either the young or the old; it seems rather to belong to middle life, that is to say, to the period between the thirties and the fifties. The pain varies in intensity from a mild intermittent ache, coming on when the patient is tired, perhaps in association with a headache, to a suffering of such intensity that she feels as though her back were breaking in two, and is unable to rise from a couch or chair without suffering, often expressed in loud groanings.

Etiology.—It is not my purpose to make more than passing mention of those acute lumbagos which come on after exposure, or after sweating and allowing the wet clothes to dry on the back. The pain in such cases often begins without any warning, striking the patient utterly unexpectedly, like a bullet traversing the lumbar muscles (German, *Hexenschuss*). From that time until the attack is over, all muscular exertion causes pain, often extreme, and even agonizing. The best treatment in such a case is rest in bed, a hot relaxing bath, or ironing the lumbar muscles with a hot iron as hot as can be borne through flannel, for ten or fifteen minutes. It can also be cured by thorough deep Swedish massage, the treatments being given twice a day and continued for from twenty-five to thirty minutes. The best drug is aspirin in ten grain doses, followed by four or five doses of five grains each, at intervals of an hour. It is a good plan, in some cases, to inaugurate the treatment with ten grains of Dover's powder, to produce a free sweat. Sufferers from acute lumbago often find that they can ward off a fresh attack by wearing a flannel bandage, or by using a Jaeger wool bandage, made for this purpose. A plan of treatment diametrically the opposite to this is absolute fixation of the affected parts by strapping.

Backaches must be distinguished according to their location as lumbar, lumbo-thoracic, sacral, or coccygeal (to be considered under the caption coccygodynia, page 242). The common areas of location of aches in the posterior part of the lower trunk are: The coccygeal region, somewhat hidden in the cleft of the buttocks; above this the sacral or the sacro-iliac region; above this again the lumbar region; and lastly an area above the lumbar in the lower thoracic region.

These regions must always be considered as representing the structures below the skin, for example:

1. The coccyx, whether dislocated forwards or fractured, as well as the ligaments attached to it laterally.
2. The fascia overlying the sacrum with the erector spinæ muscles and the sacro-iliac joints.
3. The lumbar fascia, the erector spinæ, the quadratus, and the psoas muscles.
4. The serratus posticus inferior muscle.

They are further distinguished according as the pain is fixed in one spot or radiates. The direction of radiation is almost always downwards. In some cases the pain is central, in others more lateral, to right or left, or on both sides.

Patients, as a rule, consider that backache is due to kidney disease, if they are men; or to uterine disease, if women. It is true that pain in the back is sometimes associated with these conditions, and care should always be taken to ascertain how far they are accountable in any given case; but the idea, so firmly fixed in the lay mind, that backache is always attributable to one or the other cause is erroneous.

My own experience teaches me that a backache is not often directly dependent upon any pelvic disease, though it is a common concomitant. I would attribute most lumbar aches rather to the neurasthenic or run-down condition of the patient, inviting a local disorder in a weak spot.

This is often proven by the fact that the mere correction of a minor pelvic ailment, apart from the care of the general condition, does not do away with the backache; whereas patients with aggravated pelvic ailments, where we would most expect backache, often do not complain of it to any great extent. It is common to find backache associated with pelvic tumors or inflammatory masses pressing on the sacral nerves as well as with retrodisplacements of the uterus and chronic constipation, but, as I have said, I attribute the backache rather to the general run-down condition of the patient than to the local intrapelvic disorder. Backache is always a common symptom in nerve exhaustion arising from whatever cause. A common cause of the severe postoperative backache is the straight-out dorsal posture in which the patient lies during a long operation. The pain from the wrenching of the lumbar sinews is often far more intense than that directly associated with a major surgical operation.

It becomes a matter of the first moment to distinguish, wherever we can, between the muscular rheumatisms of the sacral region and the lower back, and the sacro-iliac joint affections which cause similar pains in these regions.

In the first place, the rheumatic trouble may have come on as a sequel to an acute attack. Again, pain in the muscles may be aroused by pressure on the muscles themselves, either upon the erector spinæ, or into the substance of the erector, the longissimus, the sacro-lumbalis, or the quadratus. The pain is provoked by such attitudes as serve to put these muscles on the stretch; and, what is most important, the pain in the muscles tends to get better with a little exercise. The patient who starts out with groanings and with great difficulty, taking a halting gait, soon steps along as though perfectly well.

Schreiber ("Die mechanische Behandlung der Lumbago," *Wiener Klin.*, 1887, p. 77) says that an intense dull pain widely extended from the sacrum to the third dorsal vertebra, not accompanied by much limitation in the movements of the vertebral column, indicates rather an involvement of the fascia lumbo-dorsalis than an affection of the muscles. When bending is possible, but straightening the spinal column is difficult and painful, the erectors are affected. Such patients preferably sit, or lie with the body inclined forward. On the other hand, difficult painful bending forward indicates an affection of the flexor muscles, the quadratus and the psoas. The psoas affection is evident in the distress occasioned by bringing into play its function of rolling the thigh outward. When the pain is higher, in the region of the fourth to seventh ribs, not influenced by bending the spine, but excited by breathing, the serratus posticus is the affected muscle.

The affections of the sacro-iliac joint are often quite different. The importance of this class of cases was first fully appreciated by Goldthwait (*Bost. Med. and Surg. Jour.*, 1905, vol. 152, pp. 593, 634), who attributes many backaches in women to a sacro-iliac luxation. The condition still awaits recognition at the hands of the profession at large.

Goldthwait says that the sacro-iliac articulations are true joints, and are by no means as stable as has been supposed, so that under normal conditions, some definite motion exists. There is always a physiological increase in this motion during pregnancy, and "possibly always, certainly occasionally, during menstruation. Injury, disease, a general lack of muscular and ligamentous tone, all are factors which cause an excess of the normal amount of motion. . . . As the female pelvis is less firmly constructed the mobility is more easily obtained." I continue to quote as far as possible from Dr. Goldthwait's monograph: "As the cases are studied, they at once divide themselves into groups: the first including those in which there is definite relaxation associated with pregnancy, representing an exaggeration of a normal physiological condition; the second, those cases in which the relaxation is associated with menstruation, apparently representing also a physiological condition, apart from any pathological change with which we are at present familiar; and the third, the cases in which the lesion is due to trauma, general weakness, or some definitely known pathological process. In general, the relaxation associated with pregnancy is more marked, as it is also more rapid in its development, but it is also more certainly and quickly rectified by treatment when the cause is removed. With the non-pregnant cases the relaxation is not as marked; there is no sudden onset with severe symptoms, but it is more insidious and also more troublesome in treatment, as the apparent cause is repeated at the return of each menstruation. . . .

"The cases which properly belong to the third group are not only more numerous, but many of the characteristics are different from those in the other groups. Only one joint may be affected instead of all three, as is common in the others, and the referred pains in leg and hip are much more common in this group than in those previously considered. The lateral deformities or deviation of the body to one side, due to the partial displacement of the bones on one side and not on the other, are common. The onset may be sudden. The so-called 'stitch' in the back following strain or overwork is in most instances due to the slipping of these bones, and in these cases the lesion represents a definite sprain, the severity of the symptoms depending upon the severity of the injury, as with sprains of other joints. The onset at other times may be more insidious, and may be part of a definite joint disease, the symptoms being due to weakness resulting from the disease, or from the presence of accompanying bone and joint structure thickening, the hypertrophic arthritis (osteo-arthritis) being the most common of these affections.

"In the general relaxation which follows prolonged recumbency upon the back, the lumbar spine straightens, and the back becomes flat. With this, the upper portion of the sacrum, being a part of the antero-posterior curve of the lumbar spine, is drawn backward. This is undoubtedly the explanation of the frequency of backache and leg pain developing at night after sleep, and also explains the more common backache after operations in which the profound relaxation produced by the anesthetic, together with the straight hard table, make the joint strain inevitable. The common way of relieving the night pain by stretching upon first waking, which draws the lumbar spine forward, is also understood with this knowledge of the anatomy. . . .

"At times the lesion apparently represents simply an excess of a normal physiological process. At other times trauma is a definite factor, 'sitting down hard,' or the 'giving way' under severe strains, such as lifting, being the two most common forms of injury. Attitudes or postures are also of importance in causing a predisposition to joint weakness or displacement. . . .

"In stout persons, either men or women, the drag of the large abdomen causes lordosis with resulting pelvic-joint strain, and explains the frequency of the sacro-iliac weakness in this type of individual. In this connection, undoubtedly, the present so-called straight-front corset, if tightly worn, must be harmful by causing an unnatural amount of lordosis and by producing too great pressure upon the anterior portion of the iliac crests. . . .

"Any motion in which the trunk or thigh muscles are used, whatever the position of the body, necessarily causes the bones to slip about or the joint to be strained. In the severest cases standing or walking is impossible, the patients describing the sensation as 'breaking apart in the middle,' or as the body 'settling down into the thighs.' With some the upright position and even walking is possible only for a few minutes, the bones apparently being held by strong muscular effort, but as soon as this relaxes, either from fatigue or in unexpected motion, the helplessness at once returns. In the mildest cases the symptoms have been so vague that the exact nature of the difficulty has been appreciated only by a most careful process of elimination.

"Of the symptoms which have been associated with this condition there is apparently quite a wide range. In the most extreme degree of relaxation or disease the helplessness is profound, nothing but recumbency being possible, while the slightest motion, such as raising the knee or moving the foot, is associated with definite movement of the pelvic joints and consequent pain and discomfort. When perfectly quiet there is little pain other than backache, and this is worse after sleep, during which the spinal muscles become relaxed and the joint strain is increased. All three of the pelvic articulations may be tender to pressure, and the abnormal mobility may be easily demonstrable. In some of the cases sitting is impossible unless the weight of the body is supported, usually by placing the elbows on the knees or by holding the seat of the chair with the hands. On walking, the movement of the buttocks up and down may be quite evident.

"In the cases in which the relaxation or disease is less marked the symptoms vary more, both as to the nature of the special symptoms, and as to their constancy. At times, only at the menstrual period is there any trouble or are the symptoms severe enough to cause much inconvenience.

"Probably the most common complaint is of backache, referred at times definitely to the sacro-iliac articulations, but often simply to the sacral region. This is usually worse on lying upon the back or with any back-straining exercise or occupation carried to the point of fatigue. When lying upon the back, the flattening of the lumbar spine necessarily strains the sacro-iliac ligaments and is evidently the cause of the backache. As this takes place only when the muscles are relaxed, it explains the pain developing during sleep, the patient often being wakened with the severe suffering. This is usually relieved by stretching or by some other change of position in which the lumbar spine and the sacrum are drawn up. The backache which develops when the patient is up and about may be brought on by any posture which causes strain on the sacral ligaments, such as lounging, sitting with the lumbar spine thrown back, or prolonged standing and walking. At times the backache is produced by a jar or by some sudden misstep in which the muscles are taken off their guard. At such times there is, as a rule, a distinct sensation of slipping or giving out, and the leg may actually 'give way,' just as the knee joint locks or 'gives way' if caught with a loose cartilage. The pain or backache may be referred to one synchondrosis or both, and with this there may be discomfort referred to the symphysis. In the cases in which the pain has been referred at first to one synchondrosis there has nearly always developed, sooner or later, a similar condition upon the other side, although frequently of less severity.

" Referred pains are quite common, and are probably due to the pressure or pull upon the nerves in the sacral region. The lumbo-sacral cord passes directly over the upper part of the sacro-iliac articulation, and it is easy to see that a slight displacement or the thickening or nodes resulting from disease might cause pressure upon this nerve trunk. Undoubtedly the pressure or irritation of the nerve received in this way causes many of the pains referred to the leg. They may be referred to any part below the seat of the trouble, to the thigh, the hip, the calf, or down the back of the leg following the sciatic distribution. These pains are practically always more upon one side than the other, but usually both sides are somewhat affected, and this, together with the fluctuation in the character of the pain, suddenly coming on or passing off, is of importance in differentiating between this condition and other conditions in which leg pains occur. That the nerves are pressed upon or irritated is not to be wondered at when the anatomy is considered. In fact, in any displacement which may occur, or in the hypertrophic arthritic thickening, the edge of the bone is so exposed that pressure or irritation of the nerve is almost to be expected. The severity of the pain is at times very great. In two of the patients it was so intense that lying down was impossible and the nights were spent pillowed up in chairs.

" Objective Symptoms: The objective symptoms are such as would be expected from our knowledge of the condition. The motions which would bring strain upon the weak part are guarded, in the severe cases this reflex guarding leading to great disability. It may be impossible without assistance to get up or to lie down. Stooping is always made guardedly and in the severe cases this may be impossible unless the knees are flexed and the spasm of the hamstring muscles released. On standing, if the sacrum is at all displaced, the lumbar curve of the spine may be obliterated or even reversed; the whole attitude being suggestively peculiar. If one side is more involved than the other, a marked lateral deviation of the body may be present, this always being away from the affected joint. A slight degree of this lateral deviation is very common.

" Forward bending, if attempted when standing with the knees straight, is limited, but is always more free if the knees are flexed, as when sitting. In the first position the hamstring muscles which are attached at the tuberosity of the ischium are made tense, and by causing strain upon the sacro-iliac articulations develop the muscular spasm. . . . The character of the disease will be determined by the general appearance of the patient and the appearance locally; that is, the presence or absence of an abscess, the presence or absence of a tumor suggesting a new growth, and the presence or absence of the same disease in other joints. In the hypertrophic arthritic process, which is by far the most common form of disease seen in the sacro-iliac articulations, there almost always is at the same time disease of the spine with the limitation of motion and other symptoms characteristic of the disease in that region."

Other causes of backache must also be borne in mind. For example, acute infectious processes, such as typhoid fever and a gonorrheal arthritis. An agonizing backache is one of the most characteristic symptoms of the onset of small-pox. Congenital deformities and osteo-arthritis due to spondylolisthesis also give rise to distressing and persistent pain in the back.

Treatment.—I shall speak first of the sacro-lumbar rheumatic affection, in which it is important, first and foremost, not to promise that a speedy cure will follow the relief of any co-existing minor ailment, such as an anteflexion, a laceration of the cervix, or a retroflexed uterus. It may be necessary to correct these errors (except the anteflexion), but the patient must be forewarned that the backache will take longer to relieve.

Whatever local measures are employed, general tonic hygienic means must also be used to build up the health and to rest and feed the tired nerves. For this purpose give nux vomica, beginning with a few drops (five) three times a day in water and increasing daily by three drops until twenty or twenty-five are reached.

I find useful a pill made after this prescription:

℞	Ex. calumbæ Ex. gentian	āā gr. j

M. ft. pil. 1.
S. Take one pill after each meal.

Dr. C. G. Hollister (*Med. and Surg. Reporter*, 1888, vol. 58, p. 201) found marvelous relief in a series of cases treated with the following prescription:

℞	Pot. iodidi	ʒss.
	Pot. bromidi	℥ss.
	Tr. colchici sem.	f℥jss.
	Syr. aurantii cort.	fʒij
	Aquæ q. s. ad	f℥vj

M. Sig. One teaspoonful three or four times a day, or oftener, until the bowels are slightly acted upon.

Massage is one of the best methods of treating backache, but it must not be given in the form of mere superficial skin frictions; the trained fingers and thumbs must first seek out the painful spots and then skilfully and thoroughly rub them, so as to increase the local circulation and thereby dissipate the morbid products in muscle and nerve sheaths.

In order to give the massage effectively, the patient lies flat on the abdomen on a hard mattress laid on the floor, or on a low bed. It cannot be properly given on a soft yielding bed, which lacks sufficient resistance, and dissipates the force applied to the muscles of the back. It is not necessary to remove all the clothes; the best material between the hand of the masseur and the patient being sheep's wool. Kneeling close by the patient on the floor or standing at the side of the couch, the masseur kneads the painful structures overlying the sacrum, or in the lumbar regions, taking care to avoid making any marked pressure directly on the bone itself. In the beginning only moderate strength should be used, but the pressure must gradually be increased to a maximum, at first with the tips of the fingers, then the knuckles, and finally the whole fist. The kneading movements are followed by hacking motions, in which the muscles are struck with the side of the open hand, the force being increased from piano, through forte, to fortissimo. In giving the kneading movements, the masseur works most comfortably on the same side as the structure under treatment, while in giving the hacking movements, he operates best across the patient. It is most important, says Schreiber, whose description I am following as closely as possible, to persist in giving the active local treatment in those very places where, according to the statement of the patient, the pain is most sharply felt. When the deepest muscles are involved, such, for instance, as the multifidi spinæ, as evidenced by the great difficulty or impossibility of rotating the spinal column, pressure movements must be used which demand all the strength of the operator, using not only his hand, but the entire weight of his body. The hacking movements are not made from the shoulder joints but from the elbow. The amount of force used will depend upon the grade of the trouble, and upon the character of the muscular structures under treatment, as well as upon the amount of subcutaneous fat, and the experience of the physician. Any little periods of rest in the treatment may be employed to test the progress made; if the patient feels pain, the treatment must be begun again and directed to the painful spot. The following movements are to be recommended:

Sitting and rising from a chair, a divan, a stool, without the assistance of the arm.

Bending over.

Lifting up objects, without bending the knees.

Sitting and putting on the shoes.

Standing and putting on drawers.

Climbing up onto a stool.

Climbing up onto a chair.

Jumping down from the stool.

Jumping down from the chair.

Bending pelvis forwards, backwards, sideways.

Making circular movements with pelvis.

Climbing over a staff.

Schreiber recommends that these movements should be repeated ten times. While at first they cause lively pain, this disappears in about half an hour, and they can be done without any suffering at all.

Those who are inclined to feel despondent over the treatment of an inveterate lumbago, would do well to recall the emphatic statement of Schreiber, namely, that his collective experiences justify him in the assertion that every muscular rheumatism, whether acute or chronic, wherever it is located, can be healed by mechano-therapy. Even cases of twenty years' standing are susceptible of the relief of the pain and the complete restoration of function within a relatively short time.

A good liniment for the patient's use is chloroform and aconite liniment. Some patients are benefited by a coarse salt rub, night and morning. Great relief is experienced for a time by the application of the familiar hot-water bag, though it is not curative. I used to relieve my patients for a long period, and in many cases effect a cure, by brushing the affected area lightly six to eight times with the Paquelin cautery heated to a cherry-red heat. If passed quickly over the surface the cautery never blisters, but leaves behind a slightly red streak. Some patients dread the notion more than the thing itself. This treatment may be used every five to seven days.

Static electricity has been used with beneficial results in many cases. Where all other means have failed, the disease has been treated by the injection of five milligrams of cocain in solution under the arachnoid of the spinal column, with instant relief.

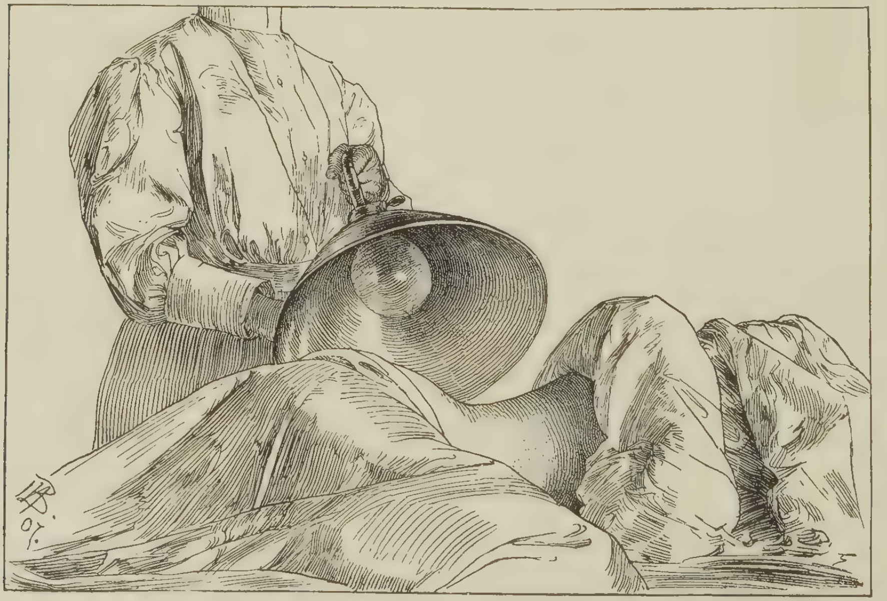

FIG. 74.—SHOWS METHOD OF APPLYING THE THERMO-LIGHT FOR BACKACHE. Note the convenient Sims' lateral posture of the patient and the distance of the light from the back.

A method which relieves perfectly and permanently a large percentage of cases, is to use heat and light rays by means of a thirty-two candle power electric light in a large parabolic reflector (see Fig. 74). This may be applied for about ten minutes every day, shifting the light over the surface when it grows too hot in one place. If the skin is covered with a wet towel the treatment is more easily borne; the moisture shuts off some of the heat rays, but does not interfere with the chemical rays. Patients invariably express themselves as greatly relieved at once and usually go on improving day by day.

In many of the cases much relief has been obtained by using woven elastic trunks, fitted about each thigh, and then about the buttocks. These are laced or buckled, so that the pressure may be controlled, and represent one of the most reliable of the various supports.

Another support and one which has probably been more satisfactory than any other, except perhaps the elastic trunks, has been devised by R. B. Osgood. It consists of a sacral pad to which a spring steel crib is attached. The ends of the crib curve backward, and to these wide webbing belts are attached, which, when fastened in front, crowd the sacral pad firmly against the upper half of the sacrum because of the curve in the crib part of the brace. The brace is kept in place by attaching it to the corsets by means of steels, and these not only hold the brace down, but, by steadying the lumbar spine, at the same time lessen the tendency to strain the sacro-iliac joints. In order to keep the brace in place when sitting, a narrow strap is attached at the base of the crib, which is tightened when the thighs are flexed and prevents the brace from springing away from the body. This brace, in connection with the elastic trunk, has given relief in the severe cases when either alone was not satisfactory.

Sacro-iliac Disease.—In sacro-iliac disease, proper support must be given to the pelvis. Goldthwait's treatment for the sacro-iliac cases varies according to the extent and the pathology of the lesion. The malposition, as he has discovered, is a backward subluxation of the upper part of the sacrum, either unilateral or bilateral, the correction of which may be brought about in several ways. Sometimes the patient is greatly relieved by lying at night on a firm bed with a firm hair pillow under the hollow of the back. In the more severe cases Goldthwait has succeeded in correcting the luxation by extending the spine, the legs resting on one table, and the head and shoulders on another, with the face downwards and the body hanging unsupported between. The sacrum is thus replaced and a plaster jacket is applied. In cases of recent injury, rest may be enjoined and later a removable jacket applied, to be worn for several months. In the joint strains or the relaxations without displacements of the bones, which represent the greatest number of cases, some sort of firm support to the pelvic bones is all that is necessary, and there need be little interruption to the activities of daily life. Goldthwait employs a spring steel brace, extending up the spine and so adjusted as to make firm pressure over the sacrum. In other cases in women, a wide webbing belt attached to the base of the corsets and kept up by the insertion of light steels gives enough pelvic support to afford relief. Such belts are made more efficacious by attaching a firm pad in the back so as to make pressure over the upper part of the sacrum.

I have cited Goldthwait in detail in order to aid in placing this important matter before the profession at large and to stimulate investigation into a class of ailments which, although common, has not hitherto been recognized. The practitioner may not feel inclined himself to undertake treatments so decidedly orthopedic in their nature, but it is at least important that he should discern these affections as a cause of backache, and be able intelligently to secure the coöperation of a specialist in bringing relief to a patient who must otherwise continue to suffer indefinitely.

The distressing post-operative backaches can be avoided by keeping the limbs and the body slightly flexed during an operation, by using pads and cushions under shoulders and knees, and, above all, under the small of the back. Anyone who will try lying on a hard flat surface without an anesthetic will find that it is a severe, almost unbearable strain to remain in the position for half an hour or more.

COCCYGODYNIA.

Definition.—Coccygodynia is a term coined by Sir James Y. Simpson, to designate several affections whose most marked characteristic is pain in and about the coccyx. The absence of any knowledge as to pathological conditions associated with the affection permits the grouping under one head of several troubles whose chief feature is pain in a common situation. As a clinical complaint, coccygodynia presents definite and clear-cut characteristics.

Early Cases.—The condition was first recognized by Dr. J. C. Nott of Mobile, whose original publication on the subject appeared in the *New Orleans Medical Journal* for May, 1844, under the title "Extirpation of the os coccygis for neuralgia." Nott's description of the clinical symptoms is lively and the theories he advances to explain the pain are ingenious. The patient was twenty-five years old, unmarried, and what we should, to-day, call a neurasthenic. Nott says "her condition was a truly pitiable one. Her general health was completely shattered and her strength exhausted with dyspepsia, constant nervous headaches, menstruation regular but difficult, excruciating pain at the point of the coccyx, pains in the uterus, vagina, neck of the bladder, and back. The most prominent symptom was the exquisite pain at the point of the coccyx, which became intolerable when she sat up, walked, or went to stool, or, in short, when motion or pressure were communicated to it in any way." This condition had followed a blow on the coccyx four years previously from which the patient recovered after several weeks' suffering, the pain not returning until about ten months before she was seen by Dr. Nott.

As medicines had already been faithfully tried, Nott at once proposed extirpation of the bone as the only chance of relief. The operation was performed, of course without an anesthetic, through a vertical incision about two inches long. The bone was disarticulated at the second joint for about two inches, separated from its muscular and ligamentous attachments, and so dissected out and removed. Nott observes that the nerves were exquisitely sensitive and the operation, though short, was, he says, "one of the most painful I ever performed." The last bone of the coccyx was carious and hollowed out to a mere shell. Nott further remarks, "this case is novel and instructive—I know of no one like it on record. No doubt many similar cases have occurred and their true nature been overlooked. I have another at this moment." The result of Nott's treatment was an entire recovery.

I have thus particularly described this early case, both because I wish to do credit to an able surgeon, one of the most original of our American pioneers, and because, aside from the antiseptic precautions which would now be present, the operation, as done to-day, does not differ in any important particular from its prototype in Nott's hands sixty-four years ago.

Sir James Y. Simpson first disseminated a knowledge of coccygodynia and he also operated for its relief by cutting the ligaments of the sides of the coccyx. His earliest publication on the subject was in the *Medical Press and Circular* for July, 1859; a full account is also given in his "Clinical Lectures on Diseases of Women," published in 1863. Simpson's publications were followed at this time by others on the same subject, but of late the affection has fallen into undeserved neglect, little attention being paid to it except in quack advertisements, as can be seen by looking through the Index Medicus for the last five years.

Etiology.—Coccygodynia is peculiarly a disease of women; I do not know of any disease, affecting an organ common to both sexes, which is so exclusively feminine. Beigel, as long ago as 1875, noted that it occurred in children.

Many cases begin with a fall upon the coccyx or a blow in which it is struck; in most of my cases such a history was given, though no fracture, dislocation, or necrosis of the bone was found at operation. A common source of injury to which patients frequently attribute the trouble, is horseback riding; one of Simpson's cases suffered intensely for years after a fall from a horse. Pregnancy and labor are important factors, though not so influential as Scanzoni believed, for he states with emphasis that thirty-four cases observed by him had all borne children. But in seven successive cases which I operated upon at the Johns Hopkins Hospital, three were unmarried, one had never had a child, and in not one of the other three was there a history of an instrumental or even of a severe labor.

The close analogy of coccygodynia with rheumatic pain in the fascia and muscles above, must be borne in mind, for it is within the range of possibility that the affection may prove to be one, not of the bone, but of the tendinous structures. Rheumatism has been assigned as the cause in many instances, and in one of Simpson's cases the pain began from sitting upon the damp ground.

Coccygodynia is often associated with uterine and other pelvic ailments, although I do not believe there is any direct causal relationship, what connection exists being probably an indirect one through the general impression made upon the health and the consequent neurasthenia. Proctitis and various rectal complaints occasionally cause disturbances similarly referred.

Nott called the affection "a neuralgia of the coccyx" and M. Graefe comes back to the same interpretation, declaring after a careful study of his cases, all of whom had borne children, that he does not believe it is due merely to the trauma of labor, but that consecutive changes in the coccygeal plexus are to blame which are analogous to intercostal neuralgia, but as little capable of macro- or microscopical demonstration. Seeligmüller, in Eulenburg's Real Encyclopedie, under the caption "Coccygodynia," follows Graefe's idea and gives the affection an equivalent name, "Neuralgie des Plexus Coccygeal."

I have cited these different opinions as to etiology, because here as elsewhere, the rational treatment must go hand in hand with our convictions as to the cause. In a general way it may be said that nervous people are most subject to the complaint, but it not infrequently appears in those who show no other sign of a neurosis.

Symptoms.—The essential symptom of coccygodynia is pain in and around the coccyx. Its intensity varies all the way from a mere suggestion or a dull aching, to excruciating suffering, requiring morphin for its relief. The pain may be intermittent, but it is usually continuous, with an intensity which varies greatly from day to day. The onset is usually gradual, but not by any means always. The act of sitting down or rising always exaggerates the pain, and in some cases sitting becomes unbearable; so that it has been called "the sitting pain." In one of my patients this annoyance was met by having a hole cut in the chair upon which she was accustomed to sit. But it is not always possible to provide such a convenience, and the sufferer may be driven to sit uneasily, first on one hip and then on the other. Occasionally in walking each step brings on a twinge of pain and the patient is gradually reduced to a sedentary existence.

The act of defecation is almost always associated with increased discomfort. Most patients with coccygodynia find the trouble worse in pregnancy. In one of my cases it was severe at such times, but almost absent in the intervals.

The causes at work in a given case of coccygodynia cannot, as a rule, be ascertained. It is certain that the majority of cases are not dependent upon abnormal length or mobility of the coccyx, nor upon fractures, dislocations, or anchylosis or necrosis of the bone. Anchylosis is too common a condition, for Hyrtl, in a collection of one hundred and eighty coccyges, found there were thirty-two in which a luxation and a consecutive anchylosis was present.

Nott, the pioneer in this field, was inclined to lay great stress upon mechanical conditions.

Diagnosis.—Coccygodynia, in its milder grades, is quite common, but the severe cases are rare. Although little attention is paid to it by the profession, it is astonishing how well known it is to the laity. There is scarcely a community without its well-known sufferer from "elongated spinal column," "fractured or dislocated coccyx," or some similarly named malady; this is probably due largely to the dissemination of quack literature. The condition is readily discovered on examination, in which the patient should lie in the dorsal or the left lateral posture; the index finger is then introduced into the rectum, and the coccyx grasped between the thumb and finger. Movement of the coccyx often reproduces the pain exactly. A further thorough examination must be made of the pelvic organs in order to exclude disease there.

Treatment.—The treatment of a coccygodynia will depend upon the severity of the case. In the lighter forms much can be accomplished by mild measures, such as proper hygienic and medical remedies, while the severer cases, as a rule, yield readily to surgical treatment. In addition to these measures, faradization may be used. By this means, Graefe (*Zeitschr. f. Geb. u. Gyn.*, 1888, vol. 15, p. 344) cured all his cases, five of them in from five to eight, and the sixth after twelve sittings. One pole is applied to the sacrum and one to the coccyx and the surrounding tissues. Seeligman put one pole in the vagina, and so cured a violent case of twelve years' standing with a single treatment. Bearing in mind the close analogy of this disease to the lumbago group of affections described in the preceding section, a thorough-going massage treatment ought to be faithfully tried before resorting to surgery.

If these gentler means fail to persuade the pain to let go its hold, then surgery comes in as a boon, as the operation of removing the coccyx is neither difficult nor dangerous.

Simpson's operation of election consisted simply in freeing the coccyx from all its muscular and fascial attachments; by this means he cured a number of cases, but it is technically as difficult as and less certain than the removal of the coccyx. In bad cases of coccygodynia, the removal of the coccyx is almost always curative. I relate the following illustrative case: Miss M., age twenty-six, Johns Hopkins Hospital, June, 1899. The patient complained of dysmenorrhea and a severe pain in the coccyx. She came of a healthy, in no way neurotic family, and had always been well up to the time her present trouble began. The dysmenorrhea had been present four years and the pain in the coccyx about one year. Formerly, menstruation had been entirely painless; it was always regular. The pain in the coccyx was associated with a sense of fulness and swelling; since its onset it had grown steadily worse, until it was impossible for her to sit down directly on the bone, and movement of the bowels was extremely painful. The great discomfort constantly endured was gradually producing nervous exhaustion.

Physical examination showed a well nourished and fully developed woman, with a retroflexed uterus, movable, and normal in size, normal tubes and ovaries. The coccyx was of normal size and position and not very movable; it was, however, exquisitely sensitive to pressure or the least movement. In view of these findings, the cervix was dilated and the uterus suspended, hoping that the relief of the intra-pelvic condition would also relieve the coccygodynia. In this I was disappointed, as she was in no way improved; so I operated again and removed the coccyx. The wound healed promptly, and the operation gave complete relief. The patient married later, has had several children, and remains in perfect health.

Sedatives and analgesics, such as morphin and cocain, ought always to be employed with the greatest care, as they only afford temporary relief and are liable to induce a pernicious habit worse than the disease itself.

CHAPTER X.

ACUTE INFECTIOUS DISEASES AS A CAUSE OF PELVIC DISEASE.

(1) Atresia of the vulva and vagina, p. 247.
(2) Inflammation of the ovaries and uterus, p. 250.
(3) Malaria and disease of the pelvic organs, p. 253.
(4) Metastases to the sexual organs during parotitis, p. 254.

ATRESIA OF THE VULVA AND VAGINA.

It is now a well-recognized fact that atresias of the genital tract, hitherto supposed to be congenital in all but the rarest instances, are sometimes acquired in the course of the acute infectious diseases, and that, in all probability, much may be done towards their prevention by a recognition of this fact.

Atresia of the vulva or the vagina may arise from infectious disease at any period of life, but it is far more frequent in childhood. A seemingly trifling infection of the genitals accompanied by insignificant symptoms may lead to a complete closure of the vagina or the hymen which will remain unobserved until suspicion is excited by the absence of menstruation at puberty. Atresias are then a class of affections which is of the utmost importance for several reasons. In the first place they have hitherto been comparatively neglected by the gynecologist, and in the second, it lies entirely within the province of the general practitioner to recognize them at their outset, which, as yet, has hardly ever been done, and to prevent their extension by the application of suitable remedies.

One of the first suggestions as to a causal relation between closure of the genital tract and infectious disease was made by Mossmann in 1881 (*Amer. Jour. Obst.*, 1881, vol. 14, p. 564). Fifteen years later Nagel (*Zeitschr. f. Geb. u. Gyn.*, 1896, vol. 34, p. 381) pointed out that it is rare to find a true congenital atresia of the vagina without some arrest of development in the uterus and adnexa, and stated that, in his opinion, most cases of so-called congenital atresias of the vagina or hymen, where the uterus and adnexa are normal, are acquired. He further held that the majority of such cases are the result of inflammation of the vulva or vagina arising during the course of the acute infectious diseases in childhood. Pincus, writing of primary amenorrhea in 1903 (*Monatsschr. f. Geb. u. Gyn.*, 1903, vol. 17, p. 751) laid stress upon the fact that many cases of retarded menstruation, accepted without question as due to congenital obstruction, are really caused by atresia occasioned by infectious disease. In confirmation of this opinion he points out that in four hundred and thirty-nine cases of atresia of the genital tract collected by

Neugebauer (I. D., Berlin, 1895) the proportion of acquired to congenital was two to one (exclusive of cases arising after parturition). The following instructive case is cited by Pincus:

A girl of fifteen had a severe attack of scarlatina, during which she menstruated for the first time. Before and after this menstruation she had a vaginal discharge lasting three weeks, which at times was stained with blood. She became thin and pale, complaining of irritability of the bladder and a feeling of uneasiness in the rectum, with headache and occasional fever. Menstruation did not return, and at the end of two months she applied at the clinic for relief, when examination showed that the entrance to the vagina was closed by a superficial membrane of a dark red color, traversed by blood vessels and somewhat excoriated. On rectal examination the pelvic organs were found normal, but a mass was felt in the lower part of the vagina. The superficial membrane was then incised and about two teaspoonfuls of a thick, purulent fluid evacuated; six days later a vaginal examination showed that the hymen itself was not closed, but completely covered by the membrane just described, which was easily stripped off. The atresia was in all probability the effect of an inflammatory process set up by the scarlatina, but had the disease occurred a few years earlier, the condition of the genital organs by the time puberty was reached might have been such as to suggest that it was congenital.

The following cases of atresia of the genital tract, reported as the effect of infectious disease of various kinds, have been collected from literature, principally from Neugebauer (*loc. cit.*):

Typhoid fever.—According to Pincus, typhoid fever is the most frequent cause of atresia, although the fact, he thinks, is little known. The literature of the subject bears out his opinion, and I have collected nine cases, the largest number associated with any one disease:

Boehm (*Rust's Mag.*, 1856, vol. 46, Hft. 1).
L. Mayer (*Monatsschr. f. Geb. u. Frauenk.*, 1865, vol. 26, p. 20).
Skene ("Diseases of Women," 1889, p. 102).
Lwoff (*Wratsch*, 1893, No. 28).
Eberlin (*Zeitschr. f. Geb. u. Gyn.*, 1893, vol. 25, p. 93).
Steidele ("Samml. von Beobacht.," vol. 2, p. 24).
Zweifel (*Centralb. f. Gyn.*, 1888, vol. 12, p. 474).

Small-pox.—The next largest number of cases reported is from small-pox:

Scanzoni ("Traité des maladies des organes sexuels des femmes," 1858, p. 416).
Alberts (*Schmidt's Jahrb.*, 1878, vol. 178, p. 45).
Johannovsky (*Arch. f. Geb. u. Gyn.*, 1877, vol. 11, p. 371).
Barthélemy (*Ann. de gyn.*, 1881, vol. 2, p. 23).
Richter ("Comment. Goettingae," vol. 2, Part II).

Dysentery:

Arnold (cited by Puech, *Gaz. des hôp.*, 1861, p. 277).
Przewoski (cited by Neugebauer, *loc. cit.*).

Pneumonia:

Schultze (I. D., Jena, 1882).

Bröse (*Thèse de Paris*, 1896).

Erysipelas:

Bourgeois (Meissner's "Forschung.," vol. 5, p. 149).

Cholera:

Ebell (*Beiträg. f. Geb. u. Gyn.*, 1872, vol. 1, p. 51).

Scarlatina:

Pincus (*Monatsschr. f. Geb. u. Gyn.*, 1903, vol. 17, p. 751) (two cases).

Diphtheria.—It would seem that diphtheria, with its known tendency to invade mucous membranes in other localities than the throat, would be responsible for inflammation of the genital tract as often as or oftener than other infectious diseases, but this does not seem to be the case. I have found but one case in which atresia of the vagina was reported as arising from it, and that was reported by Orth and cited by Neugebauer (*loc. cit.*).

Measles.—Pincus states that, to the best of his belief, no case of atresia of the vagina arising from measles has been published. Two cases of imperforate hymen, however, have been reported by Wuth (I. D. Jena, 1893) which possibly arose from this cause. In both instances the patients, who were suffering from primary amenorrhea, had had measles in childhood, but no other infectious disease; in one case a distinct scar could be traced along the closed hymen.

The whole number of cases cited is not so large as might be expected, but it must be remembered that it is only within recent years that attention has been called to the subject, and these cases have been collected from papers written to develop points quite distinct from the question under discussion. I have met with fifteen cases of atresia where no mention is made of causation; in a few instances the context implies that it was considered congenital, but in not one of these cases is there any mention of the previous history of the patient as regards infectious diseases.

The ease with which acquired atresia may be overlooked is shown in the case of Pincus just cited, and another case reported by him shows the importance of minute inquiry into the presence of infectious diseases in childhood.

A girl of fifteen, who had never menstruated, died in the third week of typhoid fever from peritonitis induced by rupture of a uterine tube. Examination of the external genitalia, made shortly before death, showed a fresh tear in an otherwise imperforate hymen, which had doubtless occasioned retention of the menstrual fluid with resulting hematosalpinx and rupture of the tube. The patient's mother stated that her daughter had an attack of scarlet fever about four years before, after which she had a vaginal discharge containing "little fragments" (probably shreds from coagulation or necrosis). This information was obtained only by persistent inquiry, and in its absence the case might easily have been set down as congenital.

INFLAMMATION OF THE UTERUS AND OVARIES.

In most of the text-books on gynecology, I find the "eruptive fevers," the "acute exanthemata," or the "acute infectious diseases" mentioned in the list of specified causes of ovaritis and endometritis, but in none which I have seen is there any more particular mention of the subject, with one exception, namely, "A Text-book on Diseases of Women," by C. B. Penrose, 1904, pp. 197, 336. Periodical literature is little more satisfactory, for of the papers scattered here and there at wide intervals, only two are important.

Ovaries.—Lawson Tait ("Diseases of the Ovaries," 1883, p. 100) called attention in 1874 to the occurrence of pelvic peritonitis after attacks of scarlatina or small-pox, stating that he had observed a number of cases of the kind in question during an outbreak of small-pox at Birmingham. Tait was of opinion that there was a special variety of inflammation of the ovaries associated with certain of the exanthemata which might or might not be followed by general atrophy of the organs, and some years later he published a case of superinvolution of the uterus which he believed to be of this kind.

After the publication of Tait's opinion the possibility of a special form of inflammation of the genital organs associated with infectious diseases was occasionally discussed, but only two of the contributions to the subject are based upon scientific evidence.

The first of these papers, by Lebedinsky (Abst. in *Centrbl. f. Gyn.*, 1877, vol. 1, p. 110) treats of the changes observed in the ovaries after death from scarlatina. The macroscopical appearances were found to be unaltered, but microscopical examination showed that the Graafian follicles were in a state of parenchymatous inflammation, varying in degree from a slight cloudy swelling to complete destruction of the epithelium. The younger the follicle the more severe the changes. The stroma of the ovary was not affected except from hyperemia of some of the solitary follicles in the connective tissue. The greatest changes were found in the ovaries of a child eight years old, who had measles three weeks after recovery from scarlet fever, and died after an illness of eight days. Here the greater part of the follicles was filled with a finely granular structureless mass, and the greater part of the cortical layer of the follicles had altogether disappeared. Scar tissue was present at all stages of the inflammatory process. Lebedinsky considered that the changes in the ovary were similar to those taking place in other parenchymatous organs during scarlatina, and believed that the degeneration of such a number of follicles results in more or less impairment of the function, sufficient in some cases to affect the reproductive capacity.

The second article is by Skrobansky (*Jour. d'obst. et de gyn.*, Oct., 1901) and contains the results of investigations into the condition of twenty-seven ovaries belonging to women and children dying of scarlatina, diphtheria, typhoid fever, and miliary tuberculosis. In all cases the ovaries had undergone more or less degeneration, but its character was the same, no matter what was the form of infection. Furthermore, neither the intensity nor the duration of the disease made any difference in the extent of the affection. In some instances where the disease was most virulent, the changes in the ovaries were of the slightest, while in others, where the disease was much lighter in intensity, the ovaries were considerably affected. From these facts Skrobansky and Lebedinsky draw the same conclusions, namely, that the changes caused by infectious diseases upon the ovaries are exactly the same as those produced by them upon other parenchymatous organs.

Since the appearance of the second of these papers, a case of abscess of the ovary during typhoid fever has been reported by B. C. Hirst (*Jour. Amer. Med. Assoc.*, Feb. 11, 1905), and another in which the uterine appendages were inflamed during the same disease by E. Dirmoser (*Centrbl. f. Gyn.*, 1904, vol. 28, p. 1177).

Uterus.—The changes wrought by infectious diseases upon the uterus were investigated by Massin (*Arch. f. Geb. u. Gyn.*, 1891, vol. 40, p. 146), and I believe his conclusions have not been contradicted. He gives a brief review of the literature and shows that up to the time he wrote, opinions upon the subject were so contradictory that it might be considered an open question. He examined the changes in the uterus, both gross and microscopical, in eighteen cases, two of which had died of croupous pneumonia, three of typhoid, one of dysentery, and twelve of "relapsing fever." In all of them he found definite inflammatory changes in the endometrium, accompanied, in many instances, by hemorrhage leading to a typical hemorrhagic condition. The inflammatory changes were the same as those observed under ordinary circumstances, but they varied in intensity with the disease, as in all cases where the temperature was persistently high there was hemorrhage, while it was present in only half the number of the milder cases. The substance of the uterus was little, if at all affected, although in a few cases the changes appeared to extend out from the endometrium. Massin concluded, therefore, that the acute infectious diseases must be regarded as one of the causes of uterine disease in women, and especially, he says, in those cases where the disease occurs before puberty.

The question whether the endometrium is liable to be affected during gonorrheal vaginitis in little girls has been recently investigated by Jung (*Centrbl. f. Gyn.*, 1904, vol. 28, p. 991). He examined nine children between the ages of two and nine, in whom the gonococcus was known to be present in either the vagina or the urethra when the child entered the hospital. The examinations were repeated every eight days in order to ascertain whether the gonococcus was still present in the cervical secretion, and were kept up for three or four months. Jung came to the conclusion that infection of the cervical secretion by the gonococcus, although it undoubtedly occurs, is of extreme rarity.

From these three articles, therefore, Lebedinsky's, Skrobansky's, and Massin's, it seems that disease of the uterus or ovaries may have a starting point in the acute infectious diseases, but that the inflammatory changes excited by these affections are not in any way different from those which they cause in other organs. It seems probable that the pelvic organs are more or less affected in almost all cases of infectious disease, but if the changes are slight they will pass away with recovery, like other changes incidental to the disease; on the other hand, should there be disturbances of a serious character, the foundation for future disease of a subacute or chronic nature will be laid.

The whole question is clearly stated by Penrose (*loc. cit.*). "Acute rheumatism," he says, "and the eruptive fevers may produce oöphoritis. The disease of the ovary is often overlooked during the acute attack while the attention of the physician is engaged with the general affection. These diseases, occurring in childhood, are the probable cause of some of the damaged and chronically inflamed ovaries with which women suffer in later life. To these diseases are also to be attributed many cases of arrested development of the sexual organs, the phenomena of which appear only after menstruation has begun. The ovarian disease in these cases may be insidious. Decided microscopical changes have been found in the ovarian follicles in scarlet fever, though to the naked eye the gland was unchanged." Again he says: "Acute inflammation of the endometrium sometimes occurs during the exanthemata. The changes which take place in the mucous membrane are similar to those seen in other mucous membranes during the course of the disease. The local condition is usually limited by the duration of the general disease. It is probable that some of the cases of arrested development in the internal organs of generation as well as cases of chronic tubal disease and ovarian disease seen during later life may be traced to this exanthematous form of endometritis occurring during girlhood."

The fact that the acute infectious diseases are the exciting cause of many cases of pelvic disease places the responsibility for their causation prominently upon the shoulders of the general practitioner. As Penrose says, the symptoms indicating the extension of the original disease to the pelvic organs may easily be overlooked while the physician is occupied with the general symptoms, especially as, in the case of the ovaries at least, there is no relation between the virulence of the disease and the extent of local changes. It is of the greatest importance that the physician should never lose sight of the fact that the pelvic organs, the vulva, and the vagina may be affected, nor allow the slightest indication of the fact to escape him. Under any circumstances a case presenting symptoms of vaginal disturbance should be carefully watched for some time after recovery, and in the case of little girls it is well to warn their parents that they should be under professional observation during the establishment of the menstrual function.

It may not be amiss to call attention here to the frequency with which menorrhagia or metrorrhagia accompanies infectious disease. The fact that the endometrium is so constantly affected makes it not unreasonable to suppose that the uterine hemorrhage, hitherto attributed to constitutional causes, may be a direct effect of the inflammatory condition of the uterus, and therefore a danger signal to the physician. If there is any purulent or bloody discharge or other evidence of a grave inflammatory or sloughing process going on, it will be best to irrigate the vagina at least once a day, using a glass catheter as a douche nozzle and washing it out with a two per cent solution of carbolic acid or a one per cent solution of permanganate of potash in hot water until the discharge ceases.

MALARIA AND DISEASE OF THE PELVIC ORGANS.

The relation between malaria and disease of the pelvic organs has been investigated by Lemanski, who published a book on the subject in 1889. Lemanski, who practised medicine in Tunis for six years, had ample opportunity for observing the effects of malaria upon the various affections of the reproductive organs. The following conclusions are taken from a copious review of his book in the *Revue prac. d'obstetrique et de gynécologie*, 1899, vol. 15, p. 39:

The malarial cachexia is a common etiological factor in the genital affections of women living in climates where it prevails. According to Lemanski's observations, cases of endometritis and metritis in malarial districts defy all forms of treatment, even curettage, until a course of specific treatment for malaria is instituted; it should be added, however, that even in cases where malaria is known to be a causal factor, curettage is often necessary to effect a cure, in association with the specific treatment.

Menstruation is often noticeably affected by the malarial cachexia even in the absence of any organic lesion. In some cases it is profuse and over frequent; in others complete amenorrhea exists from the beginning of the malarial infection. In a few cases there is metrorrhagia and the intermenstrual hemorrhages may show a periodicity resembling that of malaria and disappearing under the influence of quinine.

Pregnancy is often unfavorably affected by malaria. Labor is difficult and abortions of frequent occurrence, especially in the pernicious form. Eclampsia, on the other hand, is not common. The puerperium is apt to be accompanied by a rise of temperature, even in the absence of all local infection, but the elevation is not continuous. If the temperature is taken every hour, or two hours, throughout the day it will be found to be normal at some periods and slightly elevated at others. The special time of the day associated with the elevation is not mentioned.

The treatment of such cases is quinine, which in pressing cases must be given hypodermically. Arsenic is highly recommended, and Lemanski advises giving it in the form of a rectal enema, containing half a centigramme (about one-fifteenth of a grain) of arsenious acid in twenty-four hours, or if it is preferred an equal quantity of arseniate of soda.

I may add that it is most desirable for all physicians practising in malarious districts to bear in mind the influences which the infection may bear upon gynecological affections under their care. The existence of a malarial influence is easily settled by an examination of the blood. Dr. Lemanski considers it especially important to remember that there may be a complete absence of all symptoms commonly associated with malaria.

H. C. Coe has reported an interesting case (*Amer. Jour. Med. Sci.*, 1891, vol. 101, p. 365) in which the patient, a married woman about twenty years of age, had an attack of violent pain in the region of the right ovary accompanying menstruation and continuing after it had ceased. After the pain had lasted several days, in spite of all measures for its relief, it was noticed that it became severe every afternoon, reached its acme during the night, and then subsided by morning, though it never disappeared entirely. On inquiry it appeared that the patient had had a well-marked attack of intermittent fever of the quotidian type a few months before, in which the chill had occurred in the afternoon. Acting upon the assumption that the pain might be malarial in its nature, large doses of quinine were given each morning for several successive days with complete relief of suffering. The pain in this instance was undoubtedly associated with ovarian congestion, for the patient had had inflammatory trouble of the right ovary a year or two before, but, as Coe suggests, it seems possible to regard it as one of malarial neuralgia affecting the nerves around the ovary and comparable to similar neuralgia in the trifacial. The periodicity of the suffering he ascribed to the malarial element.

METASTASES TO THE SEXUAL ORGANS DURING PAROTITIS.

It is well known that parotitis in boys and men is sometimes complicated with orchitis, supposed to arise from metastasis, but there has been a difference of opinion as to whether the ovaries are ever affected in a similar manner. Within the last few years, however, two intelligent articles upon the subject have appeared which would seem to answer the question in the affirmative.

One of these papers, which appeared in 1902, is by a Russian, Tröitski; it is based upon observations made during an epidemic of parotitis in young girls, where the ovaries were affected in a number of cases (*Russkoi Vratch*, 1902, vol. 1, p. 582). The other article, which appeared the following year, is by G. McNaughton; it contains one case under personal observation, and gives an excellent review of literature on the subject, together with a translation of the main points of the Russian article (*Brookl. Med. Jour.*, 1903, vol. 17, p. 115).

The epidemic observed by Tröitski lasted thirty-five days, and covered thirty-three cases. The ages of the patients varied from nine to fifteen years, the majority being between twelve and fourteen. Of the whole number of patients the ovaries were affected in thirteen, eight of whom had menstruated. It was noticeable that when both parotids were affected, the ovaries on both sides were swollen and tender; while when only one parotid was inflamed, the ovary on the same side alone was attacked. The tenderness and swelling in the ovary lasted, as a rule, longer than in the parotid; in no case was there any sign of abscess formation. As no vaginal examination was made, there is no certainty of diagnosis, but the tenderness and swelling in the ovarian region were so marked as to be typical. The mammary glands were never affected. Considerable pains were taken to ascertain whether the attacks were followed by any disturbances of menstruation, but in every case the answer was negative.

McNaughton gives a number of cases collected from literature as well as his own, which was that of a young girl, eighteen years old, who had double parotitis; on the fifth day, when the swelling was beginning to subside, she was attacked by pain in both ovarian regions, which increased in severity for two days, becoming at last so intense as to require opium for its relief. At the end of the two days a bloody discharge appeared from the vagina and the other symptoms subsided. No mention is made of swelling or tenderness. The patient had menstruated regularly for four years, and her last period had been eleven days before the mumps appeared. She did not menstruate again for nearly six weeks (unless the bloody discharge during the parotitis is regarded as menstrual), making the interval between the two periods nearly two months in all.

Thirteen cases are given by Tröitski; McNaughton gives fifteen taken from literature, besides one of his own; to these I can add three, making a total of thirty-two, some of which, at least, were observed with the utmost care and intelligence, and they would seem to leave no doubt that the ovaries are sometimes affected in parotitis, although, as McNaughton says, it is perhaps going too far to assume that the ovaries alone are definitely affected, for, in the absence of any vaginal examination, it is impossible to exclude other pelvic inflammations or engorgements, especially as no opportunity for autopsies in such cases is ever afforded. The complication is probably a rare one, though not so rare as has been assumed, and if the cases which do occur were brought under the attention of the profession we might find it more common than we now suppose.

Swelling of the mammary glands and of the labia have been reported as occurring during mumps, and McNaughton gives a case of each, taken from the literature, as well as two cases of abortion, occurring during the progress of a parotitis and attributed to its influence.

The relation between the parotid gland and the sexual organs is illustrated by a unique case reported by A. Harkin (*Lancet*, 1886, vol. 1, p. 374) of a woman who had an enlargement of the left parotid during six successive pregnancies and at no other time. The swelling appeared soon after the beginning of pregnancy and continued to increase until it reached the size of an orange. It lasted until pregnancy was over, beginning to disappear as soon as labor was finished and disappearing entirely by the end of a month, except for a slight permanent enlargement which persisted after the first attack. There was no redness nor tendency to suppuration, nor were there any of the usual symptoms of pregnancy, such as morning sickness or increased salivation.

CHAPTER XI.

VULVITIS. VAGINITIS. CERVICITIS. ENDOMETRITIS.

(1) General considerations, p. 257.
(2) Vulvitis: Symptoms, p. 258. Treatment, p. 258.
(3) Vaginitis: Varieties and symptoms, p. 262. Treatment, p. 264.
(4) Cervicitis: Symptoms, p. 269. Treatment, p. 269.
(5) Endometritis: Rarity, p. 273. Varieties and symptoms, p. 275 Treatment, p. 276. Senile endometritis, p. 276.

A catalogue of the inflammatory affections of the genital tract from the vulva up to the pelvic peritoneum would serve to show the various anatomical structures in which an inflammatory affection, especially a gonorrheal infection, is prone to lodge. The organs and parts thus affected are:

The vulva.
Bartholin's glands.
Skene's glands (urethral glands).
The vagina.
The cervix uteri.
The endometrium.
The uterine tubes.
The ovarian follicles.
The pelvic peritoneum.

Vulvitis is a comparatively rare affection, seen oftenest in young persons with tender epithelia, easily attacked by micro-organisms, especially the gonococcus. The adult vagina, with its stratified epithelium, long resists the lodgment of an infection, but when once infected, it is slow to recover spontaneously. A vaginal infection is not, as a rule, of a gonorrheal character, except in the young, when it is transitory, owing to the readiness with which the vagina purges itself of its secretions and also to the fact that there are no crypts or glands to lodge an infection. The cervical canal, with its deep glands secreting a mucilaginous fluid, forms the readiest place for the lodgment of an infection, especially of a gonorrheal character, in the entire genital tract; once entered here, the pathogenic organisms are exceedingly difficult to dislodge. The endometrium, on the other hand, in spite of the fact that anatomically it would seem to form a most favorable nidus, is rarely found infected with a chronic disease, outside of the puerperal period. This is probably due to the monthly purging of this membrane. The uterine tubes, when slightly inflamed, quickly become closed in the portion which traverses the uterine cornua; in like manner the fimbriated end soon becomes agglutinated to the adjacent peritoneum and inverted on itself. In this way the tubes are converted into closed sacs or almost closed sacs, discharging the pus with difficulty, if at all, and thus serving to lodge an infection for years. The ovary is not a common nidus; in occasional cases, however, an infection, particularly the gonococcus, enters the ruptured follicles and converts the ovary into a thick-walled abscess. Abscesses of the peritoneum outside of the tubes and ovaries are rare.

VULVITIS.

Symptoms.—The initial inflammation of a gonorrheal vulvitis soon subsides, but the affection may creep into the vulvo-vaginal glands on either side and linger in the gland itself (Bartholinitis) or in the duct, indefinitely. An acute vulvitis with free discharge and with swelling is practically always gonorrheal. A form of vulvitis is sometimes seen in children, due to utter neglect of cleanliness, which is of a decidedly milder character than the specific form. Chronic eczematous conditions, often affecting the skin as well as the mucous surfaces, must be distinguished from a true vulvitis. These are apt to be localized and accompanied by great thickening as well as the shedding of epithelial débris. The patients, too, are older women (see Chap. XII). Again, the little urethral glands (Skene's glands) may lodge a drop or two of pus containing the infecting organism and so form a nidus for reinfection persisting for years. A gonorrheal vulvitis, like a gonorrheal vaginitis or salpingitis, is only to be recognized with certainty by a microscopic examination of a smear made on a slide. If the physician has not the requisite training he must send the specimen to some competent authority. An ordinary darning needle is heated red-hot at the eye end and allowed to cool; then a little of the secretion is taken up and smeared as thin as possible on a clean glass slide. This can be protected by putting another slide on top of it and sent by mail to the nearest pathologist for an opinion.

The best places from which to get the pus are the orifices of Bartholin's glands, the orifice of the urethra, or the cervix.

Treatment.—Acute vulvitis, which is practically the only form ever seen, is best treated by frequent bathing and cleansing of the parts; by vaginal douches which wash away the secretions pouring out of the vagina over the vulva; and by the application of solutions, such as the familiar lead-water and laudanum, or a saturated solution of boric acid.

When the disease lodges in one of the vulvo-vaginal glands (Bartholin's glands), one of several things is apt to take place. If the duct is affected and occluded, the gland swells up, so as to form a unilateral swelling, containing a clear sterile fluid (Bartholin's cyst), and causes the vulvar mucosa of one side to bulge out over the vaginal opening in the form of a mass the size of a pigeon's egg. If the gland itself is involved in the infection it becomes converted into a large tender abscess (see Fig. 75) which may rupture spontaneously. With the disappearance of the abscess, the gland itself may remain behind in a state of chronic inflammation, as a tender hard nodule, about the size and shape of a lima bean.

The treatment of the simple cysts of Bartholin's gland is by excision. It is not necessary to give the patient a general anesthetic to do this operation; a little freezing mixture, such as chloride of ethyl, sprayed on the part is sufficient, and then at the little frozen area a hypodermic needle is inserted and a weak solution of cocain and morphin injected. Schleich's solution (medium strength) is made after the following formula:

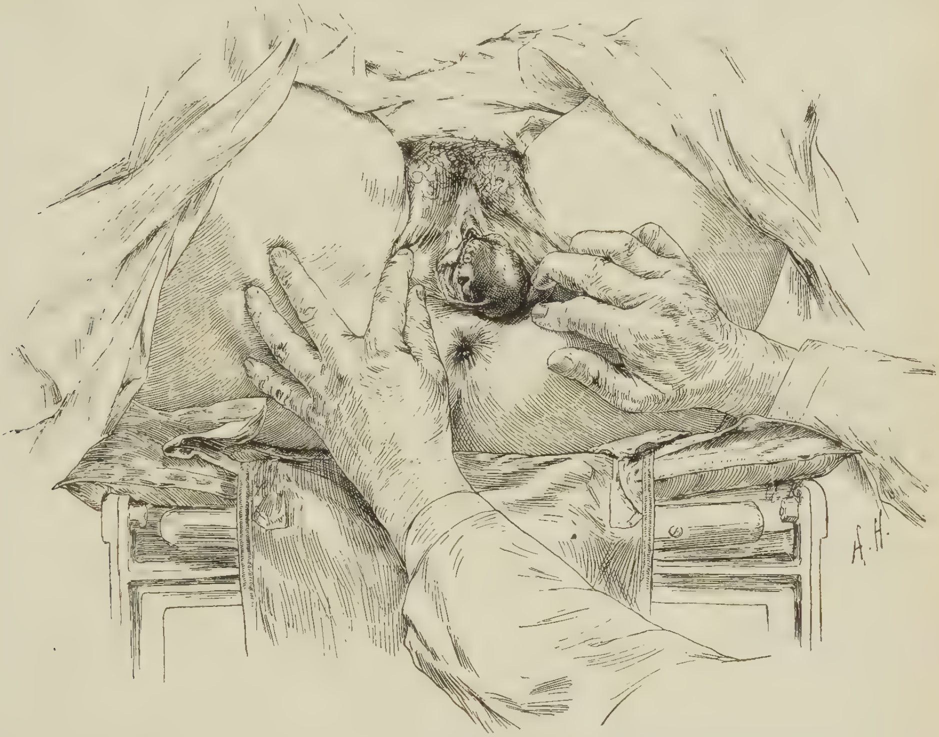

FIG. 75.—ABSCESS OF LEFT BARTHOLIN'S GLAND, DUE TO A GONORRHEAL INFECTION TRAVELING DOWN THE DUCT. The treatment in such a case is free incision and drainage.

℞ Morph. sulph.	gr. $\frac{1}{10}$
Cocain hydrochl.	gr. $\frac{1}{2}$
Saline sol. $\frac{6}{10}$ p. c.	f℥j

M. S. Use as a hypodermic injection.

After the tissues overlying the gland have been injected, it may be incised on its most prominent part; the fluid then escapes and the white walls of the gland are seen. These are grasped with forceps and gradually dissected free from the underlying tissues. The bleeding from this operation is sometimes free, though never dangerous. The operator must be prepared to pass several sutures from side to side after the extirpation of the lining membrane of the cyst, to close the wound. It is sometimes permissible simply to split the sac widely open and remove a large oval piece from the anterior wall, after which the sac is packed and allowed to close by granulation. This is not so good practice, however, as the extirpation, which takes a little more time and trouble. When the gland has become converted into an abscess, a somewhat similar plan of treatment may be adopted. The overlying tissues are frozen, and the abscess is then opened from top to bottom with a sharp knife, or with a knife followed by a pair of scissors, after which the cavity is packed with an iodoform gauze pack and allowed to granulate up from the bottom. It is a good plan to apply a saturated solution of carbolic acid on a little pledget of cotton to the whole interior of the sac. This generally wipes the infecting organisms out of existence and leaves a wound which heals much more rapidly.

When there is a chronic infection of the gland, sometimes with a fistula, the only right method of treatment is to anesthetize the patient and, after properly cleansing the parts, to cut down on the gland over its most prominent part, and extirpate it entirely, avoiding, if possible, any contamination of the wound. The operation may for a time be rather bloody, but the bleeding structures are readily seen and caught with forceps, and the hemorrhage is easily controlled by passing the catgut sutures, used to close the wound, deep enough to include and make firm pressure on the bleeding tissues.

The urethral glands (Skene's) when infected sometimes cause a decided pouting of the lower part of the urethra, and if one side only is involved, the gland may project out and displace the orifice of the urethra towards the opposite side of the body, or even convert it into a semi-lunar slit. By pressing the urethral orifice up under the pubic arch and squeezing a little from above downwards with the index finger, an infected urethral gland may be emptied of one or two drops of thick, yellow pus.

The best treatment for such a case is to use either cocain injections or a general anesthetic (nitrous oxide is the best here) and then lay the gland freely open with a small knife. After opening, it may be curetted or burned out with carbolic acid. It should be left open to granulate up from the bottom. Palliative treatments in the form of irrigations through the opening of the gland are readily carried out, but they bring about an improvement very slowly.

Suburethral Abscess.—This condition sometimes resembles an enlargement of the peri-urethral (Skene's) glands, but must not be mistaken for it. A suburethral abscess is a cushiony eminence or pouch, formed by a diverticulum from the urethra, which contains from half a drachm to a drachm of pus. The abscess is due to an infection of one of the urethral glands, and forms a tumor which sometimes becomes as large as the last joint of the thumb. It is apt to cause a good deal of pain with occasional discharges of pus, and it also gives rise to a pyuria which may be puzzling until the local examination is made. Even when the patient is examined, it is easy to overlook a suburethral abscess, as it closely resembles a simple urethrocele, or a displacement downwards of the urethra itself. The diagnosis will not, however, escape an attentive observer who makes pressure on the prominence, which is often painful, and discovers the escape of pus by the urethral orifice. On introducing a catheter, the instrument may enter the bladder and draw clear urine, and then be carried into the pocket on the floor of the urethra and draw off pure pus. The treatment of such an abscess may be by a simple incision of the anterior vaginal wall, followed by drainage. This is often sufficient to cure the case. A more complete operation, and one more agreeable to the surgeon, is the oval excision of a piece of the anterior vaginal wall overlying the tumor, followed by the extirpation of the inner membrane of the abscess down to its urethral opening. The wound is then closed by interrupted sutures from side to side, after which the patient is entirely relieved.

VAGINITIS.

Inflammation of the vagina is most commonly seen at the extremes of life; it is not so common in the middle-aged woman whose resisting powers are greater, although often seen in prostitutes. There are several forms of the disease, according to the organism provoking the inflammation. Vaginitis may also be divided according to the condition of the tissues and the distribution of the disease. A further division is into acute and chronic forms.

An analysis of the various forms of vaginitis discloses the following varieties:

1. Gonorrheal.
2. Diphtheritic.
3. Exfoliative.
4. Emphysematous.
5. The vaginitis of pregnancy.
6. Post-operative.
7. Senile.

I have adopted a convenient practical classification rather than one which is strictly scientific.

Gonorrheal vaginitis, perhaps the commonest form, is frequently found in the young, especially in children, whose epithelial tissues are more readily invaded by the gonococcus. In the earlier stages, it is associated with a vulvitis by which it is often obscured (gonorrheal vulvo-vaginitis). The disease may remain for a long time localized in the vagina, or it may spread rapidly up through the uterus and out into the uterine tubes, or onto the peritoneum; oftentimes the urethra is affected coincidently, and occasionally the bladder. Even in little children a gonorrheal peritonitis is not uncommon. Gonorrheal vaginitis is characterized at first by more or less profuse, yellowish discharge, associated with heat and a sense of fullness and bearing down, later the discharge abates and continues without any local discomfort; a febrile reaction is sometimes seen at the outset. Gonorrheal vaginitis is the only infectious form, but it is so common and the danger of infection is so great, that every case of vaginitis should be examined microscopically, to determine whether or not the gonococcus is the active organism. The material for the microscopic examination may be taken at the vulvar outlet, or a speculum may be introduced, and a little of the purulent material gathered on the end of a platinum loop, and sent to a competent pathologist, as already directed.

After the disease has persisted for some time, there is not infrequently a tendency to the formation of little papillæ, which look like red warty growths in the vagina and often bleed easily on being handled. This condition has been investigated particularly by C. Ruge.

True diphtheritic vaginitis has been frequently observed in childhood, associated with various grave infectious diseases, and is characterized by the appearance of diphtheritic membrane on the vulva extending into the vagina. In diphtheria, the organism at work is the bacillus of Loeffler; in scarlatina, it is the streptococcus. A diphtheritic vaginitis has also been observed at childbirth, affecting the lacerated, bruised vaginal tissues, characterized by swelling and redness, and an excoriating sanious discharge, accompanied by a deposit of diphtheritic membrane over all parts of the vagina. The best treatment for this serious condition is first, in true diphtheria, to use antitoxin, and second, in all cases to make free use of local washes. It is well to apply the tincture of chloride of iron and glycerin, which is useful when applied to the throat, by saturating a pledget of cotton with it, placing this in the vagina, and leaving it *in situ* for an hour or more. The application should then be removed and followed by a warm cleansing boric acid douche. Where the hymen is unruptured, warm weak bichloride of mercury douches (1–10,000) should be given through a vesical catheter introduced well up into the vagina.

An **exfoliative vaginitis** is one characterized by casting off the superficial epithelium of the vagina either as a whole or in parts. Such a vaginitis may be provoked by a strong and stringent douche, or by the use of some of the patent medicine suppositories, so widely advertised, or by using jequirity. One of these suppositories, analyzed for Dr. Gellhorn, contained, besides cocoa butter, twenty-five per cent of dried alum. A similar exfoliation occurs after the application of a strong solution of nitrate of silver to the vagina. The exfoliated membrane will sometimes lie macerating in the vagina until it is removed. On placing it in a glass vessel full of warm water, the membrane floats out and its true nature is at once disclosed. This must not be mistaken for the thin rubber covers (condoms) sometimes accidentally left in the vagina and discovered by the physician. After the exfoliation, the vaginal mucosa is a little redder and more tender for a few days, but quickly resumes its normal appearance. The act of producing an exfoliation by a drug often gives a sense of relief to patients who are suffering from pelvic neuroses or mild disturbances, and this fact forms the basis of the popularity of some of the reprehensible nostrums so widely advertised. This form of vaginitis has been particularly studied by Gellhorn (*Amer. Jour. Obst.*, 1901, vol. 44, p. 342).

The **emphysematous form of vaginitis**, first described by Winckel, is rare, and need only be noted in passing. The vagina is covered with little blebs which contain gas, probably due to the invasion of some rare gas-forming bacillus.

Vaginitis of Pregnancy.—Not infrequently a peculiar form of vaginitis is seen in pregnancy, characterized by heat, redness, and swelling of the parts, associated with a curdy discharge, and an intense itching. The latter symptom, which is most aggravating and distressing, is the chief reason for the visit to the physician. It is sometimes so intolerable as to make the life of the patient almost unbearable.

Post-operative Vaginitis.—Vaginitis is not an infrequent sequel to radical operations in which the uterus with its tubes and ovaries is amputated above the vaginal vault and removed. The extirpation of these organs undoubtedly exercises a profound effect upon the pelvic circulation; the nutrition of the parts is changed, the vagina loses its rugosities, its walls become thinner and smoother, and assume a senile character. With these changes there often develops a decided vaginitis, accompanied by a milky discharge and sometimes marked by patches of superficial red blotches scattered about the vault of the vagina. The whole picture is not unlike that of senile vaginitis, although there is no tendency to exfoliation or agglutination of the walls of the vagina at the vault.

In **senile vaginitis,** the secretion is milky, and the smooth vaginal walls show irregular patches of hyperemia, while the epithelium at the vault of the vagina often disappears, and the adjacent vaginal walls become agglutinated, in time obliterating the vaginal vault and forming septa, so that the vagina loses its capaciousness and becomes more or less conical. In all forms of vaginitis the secretion is milky or creamy or curdlike, but never mucoid or stringy.

The physician must never forget that it is perfectly within the range of possibility that a vaginitis should occur which is due to his own hands or instruments, indeed it often does occur; or that, in a patient who already has a vaginitis, the physician may himself be responsible for introducing a more virulent form of the disease. The surest way to do this is by inoculation with an unclean pessary. The instrument, taken out of a patient suffering from a vaginal infection, is perhaps rinsed in a little warm water and laid away in a drawer, and then introduced into the next patient, without any precautions to secure sterilization. The patient comes back in a few days with a sense of heat, swelling, and weight in the parts, due to the incipient vaginitis, which thus begins to run its protracted course. In the worst cases, the disease may even go farther and invade the uterine mucosa and the uterine tubes, sealing the avenues of maternity. The same infection may be brought about by the unclean nails and hands of the physician, who neglects to wash before and after examining each case. In investigating any case of florid vaginal infection, thin rubber gloves ought always to be worn to protect the examiner's hand and also the next person examined.

Treatment.—The best position in which to examine a patient is in the knee-breast posture, and the best instrument is a tubular speculum with a stout handle (see Fig. 76). This enables the observer to see all parts of the vagina, to note the conditions of the rugæ and of the parts between, and also to see whether there is any pus pouring out of the cervix. In the more acute stages of the disease, the prominent portions of the vaginal mucosa along the ridges appear swollen and much reddened, while the parts between the prominent eminences are bathed in pus. A little pressure with the end of the speculum drives the blood out of the part, which, on withdrawal of the speculum, appears for the moment preternaturally pale; the blood, however, at once rushes back into the dilated capillaries. In the more chronic forms of vaginitis, the distribution of the disease is more irregular and patchy and the secretion is less.

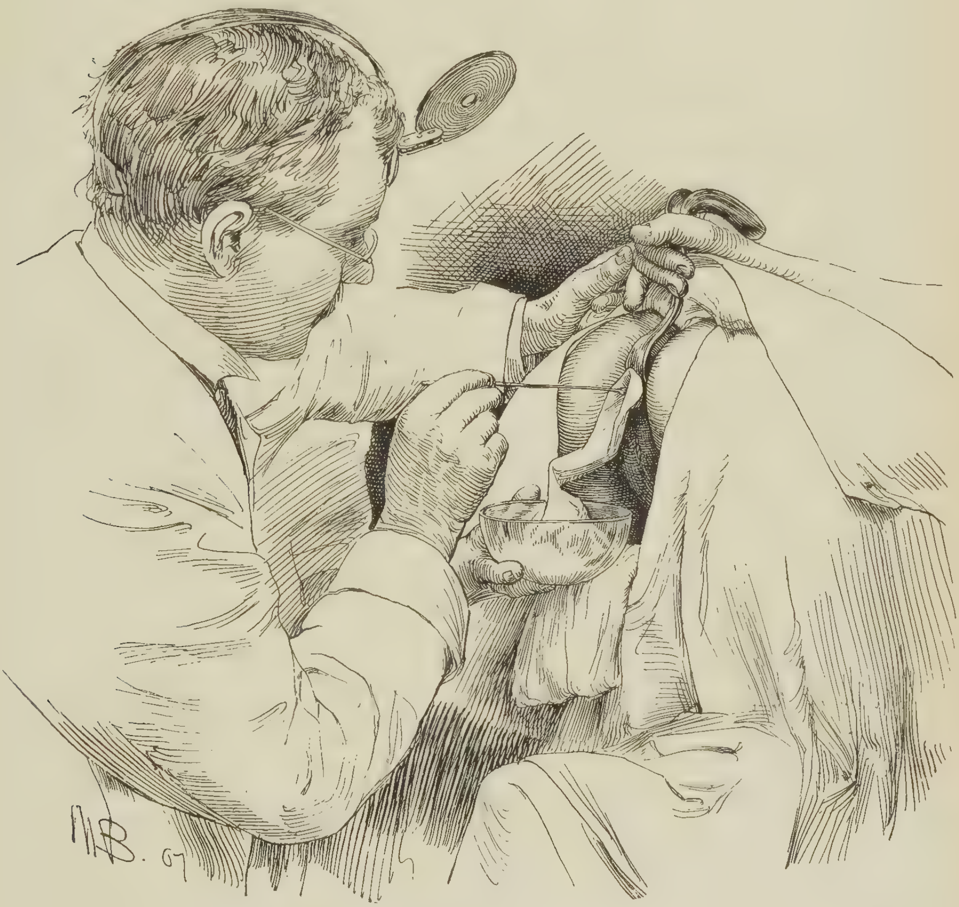

FIG. 76.—TREATMENT OF VAGINITIS IN KNEE-BREAST POSTURE. The posterior vaginal wall is lifted up, exposing the entire vagina thoroughly dilated. The examiner is engaged in putting a medicated gauze pack into the vagina through a Sims' speculum.

The treatment of vaginitis, other than the special forms already spoken of, may be carried out by the patient herself using a douche, or by the physician who gives local treatments at his office or at the bedside.

Douches are most useful here, as they serve both to carry away the irritating material, and to heal and regenerate the diseased tissues. The simplest form of douche is hot water. To this it is well to add a dessertspoonful of common salt to the quart. The patient should take a hot douche, lasting from five to ten or fifteen minutes, once or twice a day, according to the gravity of the affection. The temperature of the water at first should be 105° to 110° F., and this should then be increased rapidly up to 120° if the patient can stand it without much discomfort. While taking the douche, the patient should rest in an easy reclining position, with her hips on a bedpan, so arranged that the overflow is conducted to a waste-pipe. The douche is best given by a nurse or an assistant. A similar douche may be given in which alum is used instead of salt, in the same quantity. A weak solution of permanganate of potash, one to three per cent, may also be used in the same manner. One of the most refreshing and satisfactory forms of vaginal douches is the compound menthol powder, which I have now used for some fifteen years. The formula for it is as follows:

℞ Ol. menth. pip.	ʒjss.
Acidi carbol.	ʒiij
Alum. pulv.	℥j
Acidi borac.	℥iv

M. S. One teaspoonful to one quart of water.

Treatment at the Office of the Physician.— Aside from the acute cases, all forms of vaginitis need local treatment, such as can only be given directly by the hands of the physician, and, as a rule, best at his office.

Three postures are useful, the knee-breast, the lateral, and the dorsal. The first gives the best exposure of the parts, but when the patient cannot take the knee-breast position, the physician may treat her in the dorsal or in the Sims' posture.

The best application is one of nitrate of silver in a strong solution. Given a bad case of chronic vaginitis, the disease can often be literally expunged at a single treatment by an application of nitrate of silver to all parts of the vagina. It is my custom to do this in the following manner: I take a swab of cotton, thoroughly saturated with a solution of nitrate of silver, sometimes twenty per cent, or in milder cases as weak as five per cent, and apply this carefully to every part of the vagina until the whole interior from the vaginal vault, down to the hymen, including the cervix, is blanched white; no part should escape. This is readily done in a thorough manner by turning the speculum first in one direction and then in another until all parts are exposed and touched. The speculum is then withdrawn, taking care that none of the solution remains inside to run out and burn the surface of the body. Sometimes there is severe aching in the pelvis after a treatment of this kind; for this reason the patient should always rest for several hours; indeed, it is a wise plan to keep her in bed for several days. In the course of a few days, the superficial epithelium sloughs off in the form of a cast, more or less perfect, and is discharged with a bland, purulent secretion. At this stage, hot douches should be used of permanganate of potash or of Labarraque's solution (Liquor sodæ chlorinatæ, see p. 306), one or two tablespoonfuls to the pint of water. A radical treatment of this kind ought not to be repeated under ten to twelve days, and it is sometimes better to wait three or four weeks. I have in this way cured post-operative vaginitis which has resisted all other kinds of treatment.

The treatment of vaginitis by packs, as a rule, is rather palliative than curative. It consists of taking pledgets of absorbent cotton about the size of the palm of the hand, and attached to a thread for the purpose of withdrawal. The pledget is opened up flat and made saucershape, a teaspoonful of boroglycerid and a teaspoonful of boric acid are laid in the hollow, the cotton is drawn over the fluid, and the bolus is then introduced to the vault of the vagina with a dressing forceps. If the vagina is capacious, one or more dry packs may be applied below this. The patient should remove this pack within twenty-four hours by pulling on the string which is left hanging outside, after which she may take the douche recommended on page 266.

Another good treatment of vaginitis, through the cylindrical speculum, with the patient in Sims' posture, is the use of the puff box, commonly employed for distributing insect powder, filled with fine boracic acid powder, which is blown in through the speculum, and thus applied to all parts of the vaginal walls. A little camphor may be mixed with the powder, say two or three grains to the ounce.

In treating vaginitis, it is well to proceed somewhat in the following order:

(1) Prescribe douches, such as the boracic acid, or soda and alum douche, to be used daily. Try this for three or four weeks.

(2) Try the vaginal packs, applying them twice a week for three or four weeks, or alternate the daily douches with a pack about once a week.

(3) Make the application of nitrate of silver to the walls of the vagina, using the strong, twenty per cent solution, as a rule, only in bad inveterate cases.

In all cases of vaginitis a lingering cervicitis, should it happen to be present, must be cleared up. I have found it of value in a case of vaginitis following confinement in a stout woman, with breaking down of the outlet and eversion of the vaginal walls, to thoroughly restore the outlet, saving the tissues from attrition and preventing the hyperemia arising from congestion and imperfect circulation.

Yeast Treatment.—Within the last few years a method of treating vaginitis by means of yeast has been introduced, which has had excellent results in some cases. I cite as a competent authority H. Schiller (*Amer. Jour. Obst.*, 1905, vol. 51, p. 635). The treatment was introduced by Landau in gonorrheal vaginitis with the idea that the rapid growth of the yeast would drive out the gonococcus by depriving it of food and water. Schiller treated ten patients with good results, and there were no bad effects in any case, though some of the women complained of itching for a couple of days. The yeast used is best secured fresh from a brewery. After cleansing the vagina with sterile water, two teaspoonfuls of yeast and one teaspoonful of grape sugar solution are introduced into the vagina through a speculum, in such a manner that the portio vaginalis and the walls of the vagina are bathed in it. If this can be done at the patient's home, it is desirable. After the lapse of a few minutes, a tampon saturated with the grape sugar solution is introduced, and after from eight to ten hours a vaginal douche should be used. The treatment is repeated every forty-eight hours. The cases most suitable for the yeast treatment are especially the gonorrheal inflammations, both acute and chronic; cases of purulent vaginitis and endocervicitis which are not gonorrheal in character are also benefited.

CERVICITIS AND ENDOCERVICITIS.

Symptoms.—When an infection, gonorrheal or otherwise, lodges in the cervical glands, the cervix becomes considerably enlarged and sometimes enormously hypertrophied. The mucosa is everted, exposing the reddened lining membrane of the cervix, and the glands become hypertrophied and excessively active, pouring out a whitish, albuminous or muco-purulent, tenacious secretion. This is seen choking the cervical canal and overflowing into the vaginal vault. The picture of such a weeping cervix is quite characteristic. It should be remembered that this affection is designated by the patient as the "whites," and is, of course, not distinguished by her from a vaginal leucorrhea. The secretion thus formed is apt to accumulate in the vaginal vault, and sometimes a large quantity of muco-pus is thus retained back of and under the cervix, which, when the patient rises in the morning, is discharged *en masse*. Such a discharge is a continual distress; it produces a sense of uncleanliness, and the patients thus affected feel obliged to wear constantly some protective dressing, such as a gauze pad and a bandage. They are as much inconvenienced as by a continuous menstruation. It is important to note particularly that the cervical discharge is stringy and more or less like the white of an egg, in this way differing from the curdy, or milky, or creamy vaginal discharge. The affected glands are not infrequently closed, when the discharge accumulates within, and converts the cervix into a series of cysts (Nabothian follicles), some of which are seen on the vaginal surface, while others may be found far up in the cervical canal, extending out into the walls of the cervix proper. In rare instances the entire cervix, from the internal os down, is converted into a mass of these cysts, until the cervix is literally honeycombed. I have seen a case in which the lower segment of the uterus appeared to be converted into a large tumorous mass, from nothing else than an enormous development of these choked cervical glands. The disease causes no pain, but it is objectionable because the continual discharge is weakening to the patient, and because the presence of an infection at the ostium of the womb is a continual menace to the tissues above, making the patient more liable to a uterine and a tubal infection. Almost all of these cases of muco-purulent cervices are due to a gonorrheal infection. The disease may, however, follow an infection by other pyogenic organisms in childbirth. The presence of a cervical infection of this kind does not necessarily indicate any similar disease of the body of the uterus above it.

Treatment.—Cervicitis is one of the most obstinate of all gynecological affections. It cannot be in any way reached by vaginal douches, which serve merely to remove the débris that has accumulated in the vaginal vault. Patients subjected to mild treatments by applications will be obliged to frequent the office of the doctor year after year without gaining any substantial relief.

The first step in the treatment is to puncture any cysts that may be seen projecting from the cervix. In mild cases the cervix may be exposed with the patient in the dorsal position, and after placing a suitable pack behind it, an application may be made of a strong solution of nitrate of silver, twenty or thirty per cent strength. This may be repeated about once in ten days, the patient in the meantime using cleansing douches. The more aggravated cases of this class are those in which our predecessors used to employ the solid stick of nitrate of silver, pushing it up into the cervical canal, and leaving it there. The result of this was an extensive destruction of the contiguous tissues, destroying and curing the endocervicitis, but often resulting in the formation of cicatricial tissue, leaving behind an almost bony cervix, and in the event of pregnancy, giving rise to serious complications, on account of cervical rigidity. This practice is not to be recommended. If the patient has borne children, and the cervix is lacerated and everted as well as infected, the best plan of treatment is to excise the diseased mucosa (resection of the cervix). This operation is simple, safe, and effective, if carefully done. Incisions are made in each lateral angle between the anterior and posterior lips, a wedge is then excised from each lip, care being taken to remove the mucosa, but as little of the vaginal portion of the cervix as possible. The lips excised in this way may then be brought together by catgut sutures. An iodoform gauze pack should be placed in the vaginal vault, and the patient kept in bed for five days, after which she may get up into a chair and the pack may be removed. A few days after, douches of hot boric acid solution, half saturated strength, should be used once daily.

Where there is no laceration, or it is thought best not to operate, a most effective plan of treating these bad cervical infections is by the use of the actual cautery, as recommended by Dr. Guy L. Hunner. The cervix is exposed in the dorsal position, with a Nelson trivalve speculum, the vaginal vault is protected by a gauze pack, leaving the diseased cervix exposed in the middle; then grasping the anterior lip to fix the cervix, the cautery, heated to a bright red, is used to burn out and char the diseased tissues on all sides, and well up into the cervical canal. There are two ways of doing this: one is to char out the cervix, aiming to burn the tissues to the depth of three to four millimetres in every direction, leaving a black, unsightly cervical mucosa. The other is, to introduce the well-heated cautery well into the cervical canal and make two or three deep linear cauterizations, not attempting to burn all the tissues. Dr. Hunner has found the latter plan both simple and effective. The patient should come back for a repetition of these treatments from once in ten days to once in two weeks. A marked improvement will be noted each time. I have myself repeatedly employed the plan of extensive cauterization with happy results. It is well to wait six or eight weeks, or even longer, after cauterizing deeply.

The simple cauterizations do not call for an anesthetic. If the patient is nervous, a little weak solution of cocain, two grains to the ounce, may be injected into the cervix to benumb it. For the more extensive cauterizations, it is well to give a general anesthetic, but, as the operation is a short one, nitrous oxide gas is satisfactory for this purpose. Following the more extensive operations, the patient ought to rest for two or three days in bed. The lighter operations may be done in the office, the patient going home shortly afterwards. It is well to forewarn a woman treated in this way that in about a week or ten days there will be a slightly bloody and increased purulent discharge; this will prevent any discouragement. In all these difficult cases, the disease can be cured by this method without completely destroying the cervical glands, and without leaving behind any troublesome cicatrices. A word of caution is necessary, however, and that is, to note that Dr. Hunner has seen one case of infection travelling up into the tubes, which may have been due to the suppuration in the cervix, brought on by the use of the cautery. Prompt and marked improvement, even in the worst cases, always follows this treatment. If the thorough burning out is used, one or two treatments will often suffice. I expect after the first treatment to note from seventy-five to ninety per cent improvement in the condition. I have in this way cured a patient who had been on my hands for many years without material change and she has remained several years without a relapse.

Craig's method of treatment of endocervicitis is simpler and safer than the one just described (*Trans. South. Surg. Assoc.*, 1905, vol. 18, p. 342). It consists in the suitable exposure of the diseased cervix, thorough cleansing of the parts, and a slight dilatation of the canal, followed by the thorough use of a sharp curette (see Fig. 77). This serves to break down the diseased glands, lay them widely open, clean them out, and drain them. It is surprising to note how much tissue is removable by the curette from the rigid cervix. This treatment may have to be repeated several times, at intervals of a couple of weeks. It is in the end most effective and satisfactory. After such a cervical curettage it is well to put a boroglycerid pack against the vault of the vagina, which is left *in situ*

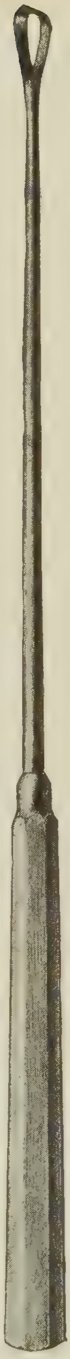

Fig. 77.—Craig's Sharp Curette for Scraping out the Diseased Cervical Glands in Gonorrheal and Other Forms of Endocervicitis.

for twelve hours, and then withdrawn and followed by a hot, half-saturated boracic acid douche.

In extremely obstinate cases, resisting all other plans of treatment, a circular amputation of the cervix will give relief. This is decidedly a major gynecological operation, however, and should only be undertaken by those prepared to do a hysterectomy, should it be rendered necessary by profuse bleeding occasioned by the operation.

ENDOMETRITIS.

A true endometritis is an inflammatory affection of the endometrium, due to the gonococcus, to other pyogenic infecting organisms, or to the tubercle bacillus. A variety of changes in the endometrium, however, characterized by a hyperplasia and dilatation of the glands are included under the head of endometritis which do not properly and in a strict sense belong there. True endometritis is seen in its best-defined form in the acute condition in the puerperal woman, or after a septic abortion due to a septic or sapremic infection. The acute form is rarely seen outside of the puerperal state; a gonorrheal endometritis, for example, which is most evident in the cervix, travels upwards, and often creates no particular recognizable symptoms as it traverses the uterus until the uterine tubes are involved. In examining many specimens of endometria, it is rare to find signs of true inflammation, or evidences of any organisms deep down in the glands or in the submucous tissue.

Out of eighteen hundred cases occurring in my own service and analyzed by Dr. T. S. Cullen, endometritis showing definite inflammatory changes, exclusive of tuberculosis, was found only forty-nine times. The mucosa of the uterus was studied in every case where that organ had been removed, or where scrapings were taken, including many cases of myomata and of pus tubes. We found that even where there was a pyosalpinx on one or both sides, the uterine mucosa was often perfectly normal. This exemption seems undoubtedly due to the fact that the uterus is so easily drained that the infectious material is not retained long enough to provoke and maintain an inflammation.

Tubercular endometritis is always of a chronic form, with the single exception of the rare miliary condition, when the general state of the patient is so bad that there is nothing to draw attention to the local trouble. In the chronic, diffuse tuberculosis, yellowish nodules are seen under the surface of the mucosa, one to two millimetres in diameter. If the disease is advanced and the mucosa is broken down, shallow, ulcerated areas appear. Sometimes in the more advanced cases, a caseous material is poured out. Tubercles show giant cells from the fusion of protoplasm of a number of cells which still retain their distinct nuclei.

Tubercular endometritis, as a rule, causes no marked uterine symptoms except in an advanced form, and it is oftenest recognized because of its almost invariable association with a tubal tubercular disease. If a tubo-ovarian mass is present and curettings of the uterine mucosa show tuberculosis, it is safe to say that the disease of the tubes is tubercular.

Gonorrheal endometritis is oftenest noted after an abortion, or in the puerperium, when the hyperemic state of the tissues favors the recrudescence, transmission, and lodgment of the disease. The hyperemia of menstruation also favors the advance of the disease to the uterine mucosa.

Such diseases as glandular and polypoid endometritis are not true inflammatory affections though classified under this head by general consent.

It is safe to say that in ninety-nine out of one hundred cases when a physician curettes the uterus for endometritis, and removes more or less endometrium, no real endometritis, in the sense of a chronic inflammatory affection, is present. True endometritis is a disease as rare as cervicitis and endocervicitis are common. The term endometritis has served as a sort of waste-basket for the gynecologist to which obscure troubles, not referable to any other well-defined disease, are commonly referred as a matter of convenience. It has in these days taken the place of metritis, to which Scanzoni gave so much attention in the early sixties. A metritis is actually one of the rarest of rare gynecological affections, and one which, outside of the puerperal state, is never recognized *intra vitam*. One of the reasons why there exists so much confusion regarding endometritis, as Dóderlein and Krönig put it, is that " in an organ so rich in glands as the uterus,

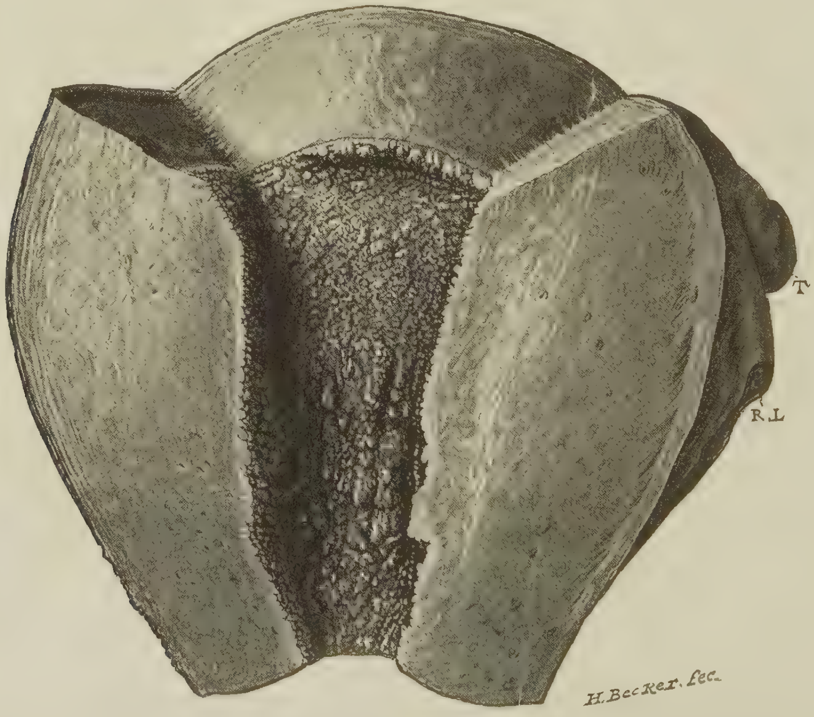

FIG. 78.—POLYPOID ENDOMETRITIS. (Natural size.) J. H. H. Gyn.-Path. No. 1466. The uterus and appendages were removed on account of salpingitis and general pelvic peritonitis. The uterus is enlarged; its walls are thickened and extremely dense. The entire uterine cavity is lined by a shaggy mucosa, consisting of small stubby polypi, which point toward the internal os. These vary considerably in size, but the majority of them are of the same size and have rounded ends. The junction between these outgrowths and the muscle is not sharply defined, nor is there any evidence that the muscle has been invaded. (From T. S. Cullen.)

it is difficult to describe an exact type of structure to which all cases ought to conform. It, therefore, becomes possible for the clinician to discover the desired pathologico-anatomical substratum in any given case."

For the sake of avoiding confusion I here use the term endometritis as it is commonly employed. The changes in the uterine mucosa affect either the glands, or the interstitial tissue, or the entire structure of the mucosa. These changes are recognized under the following names:

Glandular endometritis or glandular hypertrophy.

Hypertrophic endometritis.

Hyperplastic endometritis or polypoid endometrium.

Interstitial endometritis.

Senile endometritis or atrophy.

There is no symptom characterizing any member of this group except the senile form and the differential diagnosis is purely an act of the laboratory.

The chief symptom calling for treatment of the endometrium is excessive menstrual flow. Aside from this, it is common to curette for supposed infection and for menstrual pain.

The patients suffering from endometritis of the non-infectious form, who most urgently demand relief, are for the most part young women, whose sole symptom and complaint is excessive hemorrhage at the menstrual period or extension of the flow beyond its normal duration. These patients in aggravated cases are waxy, almost hydremic, short of breath and incapable of any other than a most sedentary existence. The hemorrhage, at first bright, becomes watery as it is prolonged. It is not too much to say that the bleeding is sometimes frightful. The anatomical basis of this hemorrhage

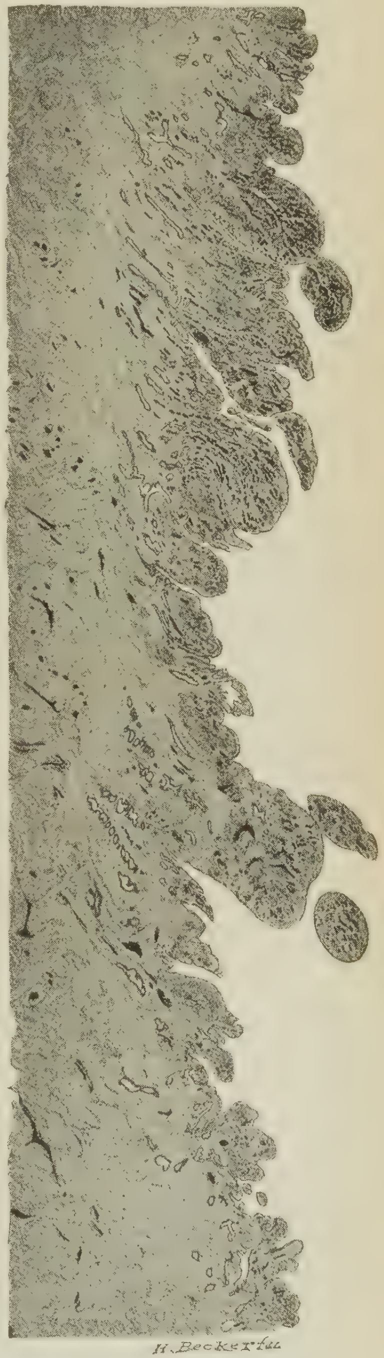

FIG. 79.—A POLYPOID ENDOMETRITIS, SHOWING A SECTION OF THE ENDOMETRIUM WITH SOME OF THE UNDERLYING MUSCULARIS TAKEN FROM A POINT NEAR THE MIDDLE OF THE UTERINE CAVITY. The redundant polypoid condition of the mucosa hanging downward toward the cervix is evident. The surface of the polypi is covered with a single layer of epithelium continuous with that of the underlying glands, while the stroma is abundant and dense, owing to a marked small round-celled infiltration. The uterine glands are diminished in number. From T. S. Cullen, "Cancer of the Uterus."

resembles a condition of multiple polypi choking the uterine cavity (see Fig. 78). The glands are greatly dilated and the blood vessels increased in number and size, but there is no evidence of invasion of the muscle, as is the case in adeno-carcinoma. A microscopic examination of the curettings should be made in all cases, in order not to mistake a cancer or a sarcoma for the disease in question (see Fig. 79). The methods of treatment are by chemical cautery or by the use of nitric acid or nitrate of silver to the interior of the uterus. The risk of setting up an inflammation in the uterine tubes by the use of these drugs is so great that they ought to be generally abandoned. The actual cautery has been used in the form of air (zestokausis), and steam (atmokausis). It is difficult to regulate these agents and prevent them from burning too deeply into the walls of the uterus, thus producing sloughs; for this reason I do not recommend their use.

The third method of treatment, curettage, is the safest of all. This should be preceded by a dilatation of the cervix, and followed by a thorough, gentle use of a sharp curette by the method described in detail in Chapters IV and VII, pp. 109 and 175.

SENILE ENDOMETRITIS.

A senile endometritis differs markedly in some of its clinical aspects from the ordinary forms found earlier in life. A careful description of this affection has been given by H. L. Dunning (*Jour. Amer. Med. Assoc.*, 1904, vol. 43, p. 767). The womb is small and shows no marked changes in the body. The diseased endometrium pours out a milky purulent discharge. This is often associated with erosion of the cervix and erosion, adhesions, and contractions at the vaginal vault. The vagina itself, bathed in the irritating secretions, is smooth, reddened, and often covered with reddish patches. The discharge accumulating in it is often offensive. A vulvitis of the shrivelled external genitals may be present and marked by intense itching. The purulent or bloody purulent discharges from the uterus are often mistaken for signs of carcinoma.

It is in these cases that the cervix, having lost its epithelium, sometimes becomes agglutinated, converting the uterus into a closed cavity which becomes distended with the accumulation of discharges and converted into a pyometra, or if gas also forms, into a pyo-physometra. The patient is apt to suffer from distress and burning in the lower abdomen and this is greatly aggravated if the cervix becomes closed. Owing to absorption of the poisonous products there may be anemia and cachexia. The ordinary senile endometritis is not associated with fever.

The inflammatory changes are found in the thin senile endometrium in which the glands, after dipping for a short distance below the surface, turn to extend parallel to the myometrium.

The treatment is by dilatation for drainage and the application of weak solutions of nitrate of silver (five to ten per cent).

CHAPTER XII.

PRURITUS. VAGINISMUS. MASTURBATION.

(1) Pruritus: Definition, p. 277. Etiology, p. 277. Symptoms and diagnosis, p. 279. Treatment, p. 279.
(2) Vaginismus: Definition, p. 286. Etiology, p. 286. Prognosis, p. 288. Treatment, p. 288.
(3) Masturbation: General considerations, p. 291. Etiology, general and local, p. 292. Prevalence, p. 292. Methods, p. 293. Clinical findings, p. 294. Effects, p. 296. Diagnosis, p. 296. Preventive treatment, p. 296. Curative treatment, p. 297.

PRURITUS.

Definition.—Pruritus is a general term which signifies neither more nor less than an itching. Hebra defines pruritus as a chronic disease of the skin, which though lasting for months and years may be characterized by no other symptom than itching. The skin may show no alteration at all, or else only such as arises from the constant scratching of the parts excited by the intense irritation. The term pruritus is used here to designate simply an itching of the vulva.

Etiology.—The changes in the skin, so often observed in pruritus, are secondary to the disease, and arise from the itching and consequent scratching or else from the presence of irritating discharges. These secondary changes do not constitute the affection, though they undoubtedly aggravate it, and for this reason the physician must always look behind the superficial affection for some one of the variety of causes in which it may have originated and by which it is, as a rule, maintained. In many cases the profound skin changes, when once induced, are sufficient in themselves to keep up the pruritus even after the original cause is removed; in fact, these cases move in a truly vicious circle: the itching provokes scratching, and the scratching, in its turn, causes changes in the skin which excite more itching, and this again provokes the desire for relief by renewed scratching, and so the disease grows constantly worse, feeding itself upon the very means which the victim instinctively seeks for relief.

In general two sets of causes are recognized as inducing pruritus, and perhaps a third. These are:

(1) Irritating secretions, acting upon the parts and often associated with a local infection.

(2) Neuroses.

(3) Blood alterations.

Diabetes may be cited as an example of the third class. Sänger considered that the pruritus observed in diabetes was hematogenous and analogous to the pruritus seen in jaundice. Many authorities believe, however, that the local action of the urine is sufficient in itself to explain the presence of irritation in this locality. Veit points out that men with diabetes suffer from pruritus of the scrotum and believes that the irritation is due to some other constituent in the urine than grape sugar, as he tried putting grape sugar compresses on the vulva of some patients without provoking itching. It is an interesting question how far pruritus is associated with constitutional gout.

As to the neurotic form of pruritus, the term is used in a general sense, as it is in nervous dyspepsia, being often employed to cover an ignorance of the true local cause. It should be recognized that the term is one of convenience only, such as we are still often obliged to use, so long as we are unable to discover locally acting causes.

The most satisfactory group of cases is that constantly enlarging one in which the disease can be attributed to some irritating or infectious secretion, continually discharged over the parts, and thus keeping up a constant irritation. It is possible that eventually some hitherto unrecognized organism, peculiarly adapted to growing in the moisture and secretions of the parts, will be found at the bottom of almost all cases, and we shall be able to refer a large number of them to a uniform cause.

Webster considers that pruritus consists essentially in a slowly progressive fibrosis of the parts (subacute inflammation of the papillary bodies), especially of the labia minora and the clitoris, by which the nerves and their endings are chiefly involved. Leopold holds that pruritus is almost always due to an old chronic endometritis.

The following causes of pruritus must be kept before the physician when he investigates any particular case:

(1) Pediculus pubis.
(2) Ascarides.
(3) Thrush.
(4) Diabetes.
(5) Nephritis.
(6) Menstrual discharge.
(7) Gonorrhea.
(8) Vaginitis.
(9) Pessaries.
(10) Pregnancy.
(11) Cervicitis.
(12) Carcinoma.
(13) Endometritis.
(14) Tuberculosis.
(15) Masturbation.
(16) Menopause.
(17) Varices.
(18) Neuroses.
(19) Gouty diathesis.
(20) Eczema.

Symptoms and Diagnosis.—From whatever cause the pruritus arises, it varies in intensity from a slight or an occasional irritation, manifesting itself in sensations of an itching, pricking, or creeping character, all the way to an irritation so severe as to be a continual torment, making the day miserable and turning the night, designed by nature for rest and refreshment, into a curse. In such cases the sufferer becomes haggard and worn with sleepless nights, made hideous by the constant impulse to relieve the horrible itching by tearing at her person, while she longs for morning to bring the activities of another day to afford a little distraction from the Promethean vulture. So intense is the suffering in these cases that the patient sometimes loses all self control and leads an isolated life, in order that she may attend uninterruptedly to the imperative demands of the disease, which excite an uncontrollable desire to rub the affected parts. Cases have even been known when, after years of suffering, the patient has committed suicide as the only means of relief from torture. Those who are blessed with immunity from this dreadful disease may be thankful that they know nothing of the suffering which it entails.

The local changes in the parts are characterized in the beginning by a reddening of the surface and then by the appearance of small flat papules, the skin over which is speedily scratched off. As the disease progresses, the skin becomes thickened and white, while long scratch marks are often perceptible. The vulvar hairs to a large extent disappear, and such as remain are broken off short; the parts are often moist with secretions. Later on, the white area increases in extent, and as the skin thickens, the normal anatomical outlines of the parts disappear. The clitoris is marked by a slight eminence or else disappears under a sort of thick white blanket, while the labia assume an almost pachydermatous appearance. When the disease is thus far advanced, the patient, as a rule, is almost beside herself with the continuous desire to tear at the parts. The changes in the affected parts are best described in the words of the dermatologist as inflammatory parakeratosis (Veit). There is an enormous thickening of the horny layer of the epidermis with an extensive small-celled infiltration just below. A pustular folliculitis is sometimes associated with the original pruritus, arising from infection of the parts irritated.

Treatment.—In almost every case of pruritus the suffering is so intense as to call for immediate relief of the local condition, but the permanent cure can only be effected by the removal of the underlying disease. One of the first steps in the treatment is a careful analysis of the urine, in order to discover a possible nephritis or diabetes. It sometimes happens that itching of the external genitalia is the first symptom of sugar in the urine. If the presence of sugar is determined, the treatment must, of course, be directed to the fundamental disease; nevertheless, it is most important to keep the parts clean and free from contamination by sponging them with a rectangular pad of gauze wet with a saturated solution of boric acid in water. Pediculi or their nits can always be found by carefully examining the vulvar hairs. They are readily destroyed by washing thoroughly with green soap and warm water and then with a decoction of fish berries. This procedure should be repeated at intervals of a few days. Shaving the parts is another good method of destroying them, as well as the application of a mixture of sweet oil and carbolic acid (ten per cent). In the case of little girls who complain of itching at the vulva, two things should always be borne in mind, namely, ascarides and uncleanliness. Ascarides are likely to be associated with anal pruritus, and when this is the case, an examination of the stools serves to clear up the diagnosis by revealing the presence of the worms. The ova are easily found in the feces, if the worms are at all abundant. Cleanliness should be enforced by insisting upon the gentle and careful, but thorough use of warm water and pure castile soap every few days. It is a pernicious training which teaches children that the genitalia should never be touched, for the natural secretions are thus allowed to accumulate, causing irritation and congestion.

Thrush, growing in whitish patches on the parts, should be removed by a thorough cleansing with warm water and castile soap, followed by dusting with dry powder, made according to the following formula:

℞ Ac. salic.	gr. ij
Pulv. camph.	gr. jv
Ac. borac.	ʒvj
Pulv. amyl.	ʒij

M. Ft. charta.
S. Dust on with a little pledget of cotton twice daily,
after careful cleansing.

A saturated solution of chlorate of potash in water used as a wash is also a good way of curing thrush.

Sometimes pruritus is excited and kept up by a vaginal discharge of a gonorrheal character. The peculiarity of a gonorrheal discharge, aside from the fact that its seat of predilection is the vulva, is a tendency to invade the cervical glands and provoke a ropy, mucoid, purulent discharge, the gonorrheal nature of which can only be determined with certainty by microscopical examination. In some cases of pruritus, however, associated with a tough muco-purulent discharge from the vagina, an examination with the microscope reveals the presence of the yeast fungus and some of these cases are associated with gonorrhea; in such cases the use of permanganate of potash is beneficial. The application of brewer's yeast has also relieved the difficulty.

In questioning or examining a patient with pruritus accompanied by a vaginal discharge, the physician must remember that the itching is more often provoked by a slight discharge of a thin quality than by a profuse leucorrheal one. A good method of testing the relation of the discharge to the pruritus is to insert a tampon in the vagina and leave it there for twenty-four hours. The patient will often declare that she has had no itching at all, while the tampon was in place, which affords a valuable hint as to the treatment. Dilatation and curettage of the uterus (see Chaps. IV and VII), cauterization of the cervix, or the relief of a vaginitis (see Chap. XI) may in such cases be followed by immediate relief. The physician must not be too sanguine, however, as to an immediate and permanent cure. All cases of pruritus should be kept under observation and examined at intervals of every few weeks for a period of several months.

Pruritus limited to the post-menstrual period does not, as a rule, call for treatment. If it is severe enough to cause decided distress, however, the physician need not hesitate to order hot vaginal douches of a saturated solution of boric acid or bichloride of mercury (1:5000).

If a pessary is worn too long, it sometimes provokes a vaginal discharge resulting in pruritus; in such a case *tolle causam et tollitur effectus.* When the cause is removed and a few saline douches taken, the disease disappears. Common table salt in the proportion of two teaspoonfuls to the pint of hot water makes a good douche.

We now come to an interesting group of cases, unfortunately still a large one, in spite of the most careful efforts to make a causal classification of them. I refer, on the one hand, to what is known as the neurosis group of cases, and on the other, to those advanced cases with extensive tissue changes in which the original cause, whatever it may have been, has long since disappeared. The question of treatment in these difficult cases, which more than all others demand our sympathy and aid, is one of peculiar importance.

In the first place, let me insist that whatever local treatment is adopted, we must never omit those powerful aids, good health, hygiene, a well-regulated diet, daily baths, and tonics. The patient must take sufficient exercise and a sufficient amount of suitable, non-stimulating food. A cold bath in the morning and a warm one at night with a careful cleansing of the parts will aid greatly in the recovery. There is no danger of contagion to other persons through using the common bath-tub, nevertheless, a due regard to the feelings of others will suggest the propriety of using a separate sitz bath for cleansing the genitals. While the patient is under observation an occasional mild hypnotic should be given to secure a good night's rest (see Chap. VIII). A prescription for this purpose should, however, never be put into the patient's hands, or she will almost surely abuse it. About once in five days a dose of chloral, ten to twenty grains, and sodium bromide, grains forty to sixty in six to eight ounces of warm water may be thrown into the rectum at bedtime. Of the various tonics and alteratives, arsenic is the best. It may be combined with a simple bitter in pill form as follows:

℞ Ac. arsenios.	gr. $\frac{1}{40}$
Ext. calumb. Ext. gent. āā	gr. j

M. Ft. pilula i. Mitte tales No. 100.
S. Take one pill after each meal.

In the advanced forms of the disease, where there are marked local changes, relief is sometimes afforded by painting the parts with pure ichthyol. After the ichthyol is applied, the patient must wear a vulvar pad to protect the clothing. Much benefit is sometimes secured by a careful application to all the diseased parts of a ten per cent solution of nitrate of silver, repeated once in every ten days or longer (Olshausen). The abnormal insensibility of the parts is such that the usual sensations of pain and even of touch are largely in abeyance, and this is so marked that a three to eight per cent solution of carbolic acid in water with a little glycerin and alcohol can be borne without discomfort and much subsequent relief. This mixture may be left in the patient's hands to apply as she feels the need of it. A five per cent carbolic acid ointment made up with lanolin, according to the following formula, may be used:

℞ Pulv. camph.	gr. jv
Menthol	gr. x
Ac. carbolic.	gr. xxv
Lanolin	℥j

M. S. Apply externally.

A small well-defined area of beginning pruritus has been cured by treating it with pure carbolic acid, the application being limited to the spot.

Cocain ointment sometimes affords relief.

℞ Cocain hydrochl.	gr. vj
Lanolin	℥j

M. S. Apply externally.

Coating the parts with cod-liver oil gives temporary relief. Naphthalin and anesthesin in a ten per cent solution, made up with lanolin, thoroughly applied to the parts has been found useful.

A method of treatment in vogue at a time when men paid more careful attention to the compounding of prescriptions than they do now, was to put the patient to bed and bathe the parts with a continuous application of a zinc oxide lotion, made according to the following formula:

℞ Zinc. oxidi	ʒij
Mist. acaciæ	℥j
Aq. rosæ	℥v

M. Ft. lotio. S. Use externally.

This must be washed off thoroughly with a thin starch solution and the parts covered with benzoated ointment (West).

Scanzoni recommends the use of a solution of caustic potash in water, about seven per cent, lightly applied with a brush, copious ablutions of cold water being used as the disease improves.

A hip bath of water as hot as can be borne, containing as much sea salt as will make it about as strong as sea water, is often of value.

C. Ruge (*Centrbl. f. Gyn.*, 1896, vol. 20, p. 480) takes the positive position that pruritus is almost always of local origin, being due to some chronic or bacterial source of irritation, and that, therefore, it can almost without exception be cured, even in the worst cases, by a thorough cleansing of the parts. The best way to carry out Ruge's suggestions is to put the patient under an anesthetic, and after shaving the parts, to remove all the epidermis which will come off without exciting hemorrhage, by means of a scrubbing brush and soap.

Flaischler, following the same idea, recommends applying a twenty per cent solution of nitrate of silver. In one case he gave complete relief by using a fifty per cent solution.

A ten per cent thymol salve (Gottschalk) is a valuable remedy for the relief of the itching.

℞ Thymol	10 parts
Ung. petrolat.	100 "

M. S. Apply externally.

Soaking the parts in a one per cent solution of nitrate of silver for hours at a time is sometimes of great assistance in producing a permanent alteration for good in the condition of the parts.

C. D. Meigs described a case which he considered was due to a trichiasis of the vulva. He found that the hairs springing from the margin of the mucous membrane were pouting inwards, so as to irritate the membrane and occasion the most distressing itching. When these were removed the pruritus disappeared.

I have found much relief attended the use of a lotion of lead water and laudanum made up with lime water instead of plain water.

℞ Liq. plumb. subacet.	fʒij
Tinc. opii	fʒij
Liq. calcis	f℥vj

M. S. Apply externally.

Another remedy which often gives relief is a two per cent carbolic acid poultice. I have used cherry laurel water with great satisfaction (Aq. lauro. cerasi), when the genuine article can be secured. The following prescriptions for topical applications are given by Goodell:

℞ Chloralis Camphoræ ā̄ā	℥jv
Rub into oil and add:	
Ung. simplicis	℥j
Pulv. ac. borac.	℥jv

M. S. Apply externally.

℞ Ac. acetici	℥j
Glycerinæ	℥iij

M. S. Apply externally.

℞ Sod. borat.	℥ij
Morph. muriat.	gr. xx
Ac. hydrocyan. dil.	fʒj
Glycerinæ	f℥j
Aq. rosæ ad.	f℥viij

M. S. Apply externally with a pledget of cotton.

For pruritus of diabetic origin, Goodell speaks most highly in favor of the following formula, used by Dr. James Simpson of Philadelphia, namely, fifteen grains of the salicylate of soda, in glycerin, given by the mouth every four hours.

Schleich's solution (see p. 259) injected into the mons veneris has been found beneficial in some cases. I should be inclined to extend the use of this injection to the ilio-inguinal and genito-crural nerves above and the perineal nerves below.

The use of the galvanic current has been followed by brilliant results in some cases in the hands of several authorities. Cholmogoroff (*Centrbl. f. Gyn.*, 1891, vol. 15, p. 612) cites an instance where he cured a severe case of two years' standing in six applications. The method of application is as follows:

The positive pole (anode) is introduced into the vulva at the vaginal orifice, while the negative pole (kathode) is carried by means of cotton wet with salt solution all over the affected parts. The sitting should last from ten to fifteen minutes. The patient should take the current as strong as she can comfortably bear. H. von Campe also cured a bad case of five years' standing by this method (*Centrbl. f. Gyn.*, 1887, vol. 11, p. 521).

The X-ray may be tried in the treatment of pruritus, but its value has not yet received clinical confirmation.

If cleansings (Ruge), baths, topical applications, and galvanism, employed while the cause of the affection is being sought for, do not succeed in relieving a distressing case of pruritus with extensive changes, it is best to resort to surgery and excise all the diseased tissues, cutting away the clitoris, the nymphæ, and the adjacent parts of the labia majora in the form of an inverted λ, drawing the remaining tissues inward, and attaching them to the mucosa at the vaginal orifice.

Hirst (*Amer. Med.*, May, 1903, p. 785) cured a case by excising the nerves going to the parts, after exposing them by making four incisions, two in the groins and two in the buttocks. It is not within the scope of my present purpose, however, to do more than indicate the value of surgery as a last, but most helpful resource.

Pruritus in Pregnancy.—There is one special form of pruritus which occurs in pregnancy and is peculiarly distressing. It usually appears in the later months and the patient complains of the most distressing sensations of heat, swelling, and itching of the parts. An examination shows the external genitals red and swollen and often excoriated by scratch-marks. The vagina also is swollen, and covered with a curdy white discharge. It is the association with a vaginal affection which distinguishes this form of pruritus from other varieties. The condition comes to an end with the termination of pregnancy, but it is often difficult to cure before its natural terminus is reached. The patient should be kept quiet and use a hot permanganate douche (one to three per cent) two or three times a day. Bathing with equal parts of alcohol and water is of service, to which may be added sufficient cocain to make a one to two per cent solution. If the itching persists in spite of mild local treatments, the patient may be put into the knee-breast posture and, after the vagina is exposed through a large cylindrical speculum, it is everywhere swabbed out with a five per cent solution of nitrate of silver. This treatment will bring away a superficial cast of the vagina in the course of a few days. After three days the douche treatment may be resumed, until the vagina appears normal. Ashwell recommends the following prescription of Meigs, using the language of the latter in doing so, "having been a great many times consulted for the relief of pruritus vulvæ and most frequently by pregnant women, I have rarely had occasion to order anything more than the following formula, namely:

℞ Sod. biborat.	℥ss.
Morph. sulph.	gr. vj
Aq. rosæ dest.	℥viij

M. S. Apply three times a day to the affected parts with a piece of lint, after washing with tepid water and soap and carefully drying the parts.

In the worst forms of the affection it has been found necessary to terminate pregnancy.

VAGINISMUS.

Definition.—Vaginismus is an affection first named and fully described by Marion Sims. It is characterized by violent reflex spasmodic contractions of the muscles around the entrance of the vagina, namely, the sphincter vaginæ, the levator ani, the transverse perinei, and the adductors of the thighs. This condition of muscle spasm is called forth either by an attempt at coitus or the effort to make an examination of the vagina.

It is a disease of married life and for the most part of young women, persisting sometimes for many years. Sims, whose descriptions of it are unsurpassed in clearness, says: "By the term vaginismus I mean an excessive hyperesthesia of the hymen and vulvar outlet, associated with such involuntary spasmodic contractions of the sphincter vaginæ as to prevent coition. This irritable spasmodic action is produced by the gentlest touch; often the touch of a camel's hair brush will produce such agony as to cause the patient to shriek, complaining at the same time that the pain is that of thrusting a knife into the sensitive part. In a very large majority of cases the pain and spasm conjoined are so great as to preclude the possibility of sexual intercourse. In some instances it will be borne occasionally, notwithstanding the intolerable suffering, while in others it is wholly abandoned, even after the act has been repeatedly, as it were, perfectly performed."

The spasm of the muscles about the vaginal orifice varies with different patients, all the way from a distress which, though severe, can be endured and with great difficulty overcome, by a woman who is determined to submit to her wifely obligations, to the most uncontrollable apprehension and agonizing pain. The area of sensitiveness in vaginismus is situated about the urethra, the hymen, and especially the posterior commissure, from which it extends over the entire vulva. In some cases there are manifest changes at the orifice in the form of exquisitely tender deep red spots; fissures may also be found in the vulva, resembling painful fissures of the anus.

A picture of vaginismus is sometimes seen in the examining room, when the physician, perhaps with large fingers and clumsy efforts, attempts to force the digit through the vulva and hymen in his efforts to penetrate the vagina. The mucosa at the vaginal orifice is naturally delicate and sensitive, and it is capable of acquiring an extraordinary degree of sensibility through the attitude of expectancy, whether of pleasure or of pain. This shrinking and supersensitiveness constitute one of the safeguards of young womanhood before the maturation of the sexual function.

Etiology.—As a rule, the vaginismus is present from the first attempt at coitus and acts as an insuperable barrier, so that when the parts are examined by a physician, the hymen is found intact. In some cases, however, intromission is occasionally successful and the vaginal orifice, when examined under an anesthetic, presents no abnormality. It is noteworthy that vaginismus is rarely present among the poor, while it is often seen in the hypersensitive women of the leisure classes with neuropathic constitutions. Masturbation has been assigned as a cause in some cases.

Vaginismus may be the consequence of a gonorrheal infection. It is sometimes due also to some degree of male impotence, whereby the relationship is not fully consummated at first. The element of anxiety and uncertainty associated with ill-directed efforts on the part of the husband is not without its effect upon his co-respondent wife. The *libedo sexualis,* which normally obtunds and renders transitory the natural pain of the first cohabitation, disappears, and an attitude of anxious expectancy takes its place, which, in time, is converted into apprehension and abhorrence, so that instead of gratification, the wife feels disgust, and instead of pleasure, pain.

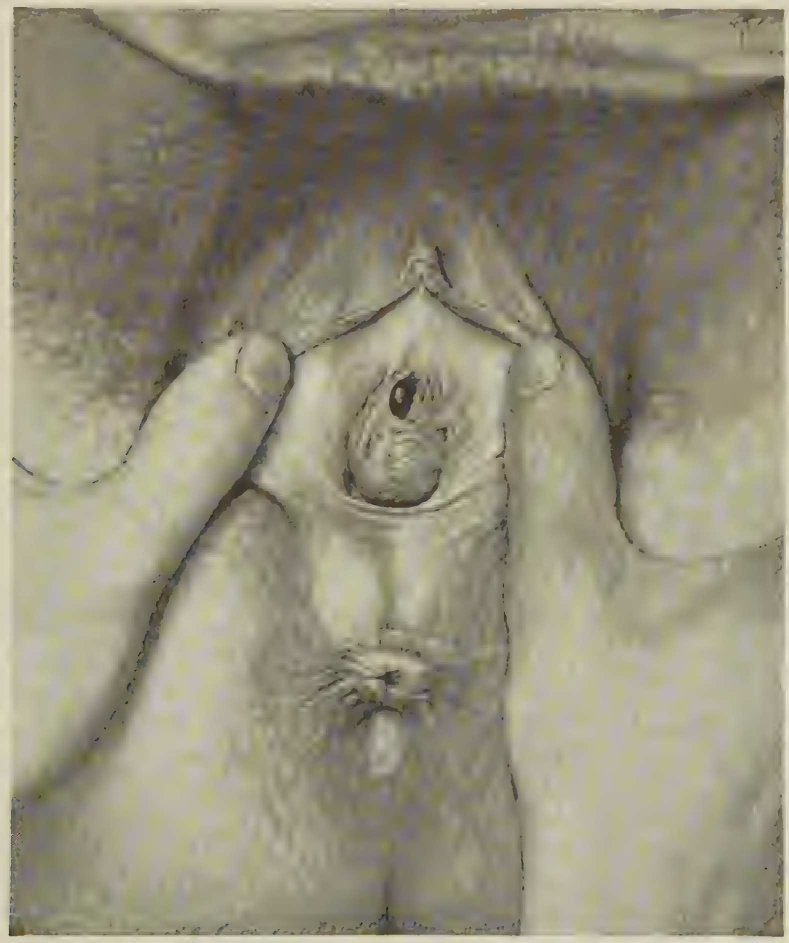

Fig. 80.—A Urethral Caruncle Resembling a Small Dark Hematoma Springing from the Right Posterior Margin of the Urethra. On closer examination it is seen to be an intensely injected tumor springing from the mucosa. It is usually sessile and often extends upward into the urethra.

There is a urethral form of the disease which I would associate with a gonorrheal infection, in which the meatus urinarius is swollen, red, everted, and exquisitely tender. The pain on contact is fully equal to that induced by a urethral caruncle. Here the vaginal orifice and all the surrounding parts can be freely touched, provided only the urethra is let alone; while any contact with or attrition of the urethra provokes a violent and utterly unbearable pain.

Sometimes when the parts at the vaginal orifice are exquisitely sensitive and the patient shrinks from the slightest and gentlest contact, shrieking when the finger impinges upon the parts, the whole trouble will prove to arise from a cause of no greater significance than a urethral caruncle (see Fig. 80). The true caruncle is a deep-red, well-defined, vascular tumor projecting from one side of the urethra and often flattened like a cockscomb or, when sessile, a mulberry mass. A little minute observation will distinguish this well-defined tumor from the general reddening and swelling of the meatus just described.

Occasionally, vaginismus is seen in a physically ill-matched pair, that is to say a little woman, childlike in both person and temperament, wedded to a man of large frame with insistent sexual desires. Here, where the manifest disproportion of body is carried into a like absence of correlation in the sexual organs, great distress may be occasioned by the marital approach, ending in a condition of general hysteria with a well-marked vaginismus. This explanation of vaginismus, as being due to disproportion between the intromittent organ and the receptive channel, is one which appeals to the lay imagination as the great common factor in producing the disease. It is, however, extremely rare.

Another cause of vaginismus, more frequently noted, is the displacement of the fourchette and the orifice upwards and forwards, making the channel difficult of access, and rendering the urethra and clitoris liable to injury from too frequent forcible impacts.

Prognosis.—The prognosis as to recovery in vaginismus when left alone is bad. Pregnancy is rare under the circumstances; nevertheless, it may take place, and when this is the case the vaginismus is usually relieved, though not necessarily so. Sims cites a remarkable instance in which the family physician anesthetized the wife for the first coitus, which then offered no difficulty; he continued to do this at bi-weekly intervals for a year, when she became pregnant and bore a child at term. The old pain returned, however, and it became necessary to resume the "ethereal relations." Sometimes the distressed and suffering wife secures an immunity from any approach and lives from year to year as in her maidenhood, a *virgo intacta*.

Treatment.—Every case of vaginismus must be taken seriously and faithfully treated until a permanent recovery is assured. The first step is to secure for the wife rest and freedom from importunity. If she is subjected to continual approaches and submits to frequent ineffectual attempts to overcome the difficulty by the natural method, the nervous system often breaks down and she becomes a physical and mental wreck. In order to secure the quiet which she needs, she must sleep alone; some sedative should be given for a few days at the beginning of the treatment to secure a habit of sleep. It is most important to keep up a hygienic regimen by using daily cold baths or spongings, as well as early rest and exercise each day, according to the needs of the individual case.

The active treatment of a vaginismus begins with the effort to discover some well-defined local cause which can be removed. As a rule, it is impossible to make a thorough examination in the usual manner on the office table. The patient, with the best will in the world, involuntarily draws her thighs together, and even if the examiner by dint of persuasion and great difficulty succeeds in introducing a well-oiled finger he has accomplished nothing. It is best then to insist upon a complete examination under anesthesia at the outset, securing permission to remove any minor cause of the trouble which may be found at the same time. Careful inquiry must be made beforehand as to the potency of the husband and as to any history of gonorrhea. Nitrous oxide gas will not suffice to induce the necessary relaxation; ether or chloroform must be used.

The vulva is examined for signs of inflammation, fissures, or red spots. The condition of the urethra is noted as to whether it is swollen, red, or everted. A urethral caruncle, if present, must be treated according to the following method: (1) it must be thoroughly removed down to and beyond its base; (2) this may be done under cocain anesthesia (ten per cent), by laying a pledget of cotton saturated with the drug on the growth for ten minutes; (3) when the growth is pedunculate, it may then be grasped, drawn forward, transfixed, tied both ways, and then cut off well beyond the ligature. The removal of a sessile growth is a delicate piece of plastic work, and the physician would do wisely in such a case to consult a specialist. Any fissures or little superficial ulcerations surrounded by an intensely red area near the hymen are noted. The hymen itself is observed, to ascertain whether it is intact, and whether inflamed or not. The vagina and the cervix uteri are examined for evidences of gonorrhea. It is a good plan to dilate the cervix in order to facilitate pregnancy. If gonorrhea is found, an effort may be made to wipe it out at once by using a strong (thirty per cent) solution of nitrate of silver, carefully applied to all the affected parts. A gonorrheal urethritis is also well treated by repeated applications of a two to three per cent solution of silver.

If the case is not extreme, two remedies may be tried: first, putting a pledget of cotton saturated with a ten per cent solution of cocain at the vaginal orifice for ten minutes and removing it just before coitus; secondly, the immediate application, upon removing the cocain, of a quantity of vaselin to the parts. If this plan works well, it can be repeated.

In simple cases, that is to say cases where there is no inflammatory basis and no inflammation has been superadded, the use of the galvanic current has succeeded in several instances in effecting a complete cure. Lomer (*Centrbl. f. Gyn.*, 1889, vol. 13, p. 870) cites a case lasting five years and associated with frequent involuntary perineal contractions, in which he used a weak, barely perceptible galvanic current every two or three days for four or five minutes at a time. In six weeks the patient was completely cured and had had no return of the trouble at the end of six months. Another similar case was cured by him in like manner. In both cases there was dysmenorrhea, which was also relieved to some extent by the treatment.

If inflammatory areas or fissures are found in the neighborhood of the vaginal outlet they should be dissected out in a linear manner and the mucosa carefully brought together with a fine catgut suture.

When no evident cause is found, or when the hymen is intact or deeply reddened, no plan which has yet been devised is equal to that of Marion Sims, namely, removal of the hymen, the incision of the vaginal orifice, and the subsequent dilatation of the orifice. The patient is profoundly anesthetized and the parts cleansed, after which the hymen is seized on one side anteriorly by a pair of rat-toothed forceps and pulled out, being excised at the same time well down to its base in one continuous piece on the right and left sides posteriorly. When this has been done it was Sims' custom to pass two fingers into the vagina to stretch the outlet and then to make a deep cut in each sulcus about two inches long, united at the raphe, and prolonged in the form of a Y quite down to the perineal integument. Each cut was about half an inch or more above the sphincter vaginæ, half an inch over its fibres, and an inch from its lower edge to the perineal raphe. These operations were then followed by the insertion of a bougie or a dilator three inches long and an inch and a half in diameter in order to stretch the opening. This was worn for two hours in the morning and two or three in the afternoon for a period of two or three weeks. The bougie is of conical form and open at its outer end, with a depression for the urethra.

The plan of having the patient repair to the physician's office regularly for the purpose of having him stretch the outlet by the insertion of specula of successively larger sizes does not seem to be worth trying, from the experience of many persons, though it suggests itself as useful.

Veit, who has made a most careful study of the treatment of vaginismus, has given up the excision of the hymen to a large extent in favor of two radiating incisions, cutting through, not only the hymen but the sphincter vaginae as well. Then, to check the hemorrhage, the wound is closed with superficial and deep sutures of the vulva, passed in the same direction, and attaching the vagina to the vulvar mucosa. Veit uses interrupted silk sutures and removes them in ten days, after applying cocain. The effect of such an operation is to convert the nulliparous outlet into the shape of a parous one. After recovery from this operation, the outlet is habituated to the passage of tubular specula, increasing in size, under cocain anesthesia. Finally, when the patient can stand the introduction of a speculum, three centimetres in diameter, without cocain and without the use of any lubricant, she is discharged as cured. Veit insists that the important point in this treatment lies in the after management of the case.

MASTURBATION IN WOMEN.

General Considerations.—A strong instinct of repugnance impels us to gloss over this section of preventive gynecology, and to revolt when sacrilegious hands are laid on our ideal of purity. But the family practitioner is under obligation to see that the mother warns and watches her growing girl; he may no longer ignore the prevalence of the danger; he must recognize the marks of the yielding to this temptation in time to help; and he cannot avoid some study of autoerotism in women if he would give effective counsel at critical periods. In a restricted space conclusions only can be given. Reversing the usual order, however, the common degrees of the habit among ordinary individuals will receive attention rather than the rarer excesses of the unbalanced. Yet these lesser troubles are the more difficult, since there is no recess in the world so truly impenetrable as that chamber of the adolescent's mind where she hides her questioning concerning the vague stirrings of love and sex-consciousness. If we start with the proposition that some curiosity about the awakening genital sensations of puberty is normal, and some pressures and frictions instinctive, then we may fairly consider restriction of such experimentation a stage of advance, and entire freedom from contacts a high degree of self-control. Animals in youth and in the periods of sexual excitement exercise such practice; in some tribes low in the scale it is universal among the women; in the Orient and in ancient times there has been the uttermost openness of excess. Such primitive instincts, often reinforced by neurotic heredity and a will little trained in self-control, leads the child directly toward trial of these excitements.

Boys teach each other this vice more often than girls do. The muscular activities of the young male, and the traditions of the hurtfulness of excess, make for moderation, whereas the secretiveness of the girl lessens the chances of detection or confession of a solitary indulgence that is self-taught. Among the crowded poor and the ignorant foreign population evil communications are facile. But in any individual, in adolescence, the soil is fertile, with its emotional and affectional fervors and introspective intensities. "These years are sensitive to all matters pertaining to sex, even very remotely, to a degree about which the ordinary parent is densely ignorant and optimistic." It should not surprise us then, if, in the common absence of all instruction, and in the presence, let us say, of some pelvic disturbance, the habit were often started. Add to the monthly rush of blood to the genitals, the friction of the napkin, the suggestiveness of the hot-water bag, the lying awake in day dreams in bed the first day of the period, and we may well fear such arousing at some time during the seventy periodical opportunities between puberty and nubility.

The danger zones are these: Infancy; puberty and the years immediately following; school and factory life; engagement; marital maladjustment; widowhood; the pre-climacteric sexual activity; and any long period of nervous intensity or breakdown. Rare before puberty, the usual time of beginning is just afterward, and the average time of excess is within the next four years.

General Causes.—Parents who are intemperate, whether through weakness of will or excess of passion, transmit such tendencies. Among neurasthenics more than half have been masturbators at some time, and the most pronounced cases are very generally found among them. The two great main causes, however, are: defective education, and its result, defective self-control. Ignorance of the simplest sex knowledge, infirmity of body, absence of absorbing and healthful occupation, insufficient out-door exercise, lack of a constant stream of elevating influences and stimuli—all these favor the habit, particularly where, as in certain natures, there is capacity for an overplus of sexual passion. Among the most potent factors are undoubtedly these three: Emotional excesses, when feeling fails to be translated into action, whether it be roused to frequent intensity by novel, or theatre, or sermon; self-indulgences, such as late rising, and all idleness, sulky reticence, and hysterical outbreaks; and intimacies of the person, whether the liberties be with other girls, or with boys and men.

Local Causes.—Irritation from lack of cleanliness is found not alone among the tubless. The fastidious not infrequently fail to clean the space beneath the prepuce and the interlabial grooves. Vulvitis, eczema, parasites, leucorrheal discharges, and highly acid, concentrated, or diabetic urine bring about irritations and scratching. Ill-fitting clothing may also do so. Rectal worms, anal fissure, and chronic constipation are some of the causes of congestion and itching. All pelvic disorders whatever, and particularly ovarian irritations, draw the attention to these sensations, and such inflammations and displacements constitute the most important of the local causes.

Prevalence.—We have no means of estimating the frequency either of minor degrees of self-abuse or its occurrence among healthy individuals. Among boys "whenever careful researches have been undertaken, the results are appalling as to prevalence." For women of loose life and certain peasants there are figures showing a very frequent occurrence. Among women of a good class there are some indications that it is by no means uncommon, as for instance, where one thousand consecutive gynecological cases showed well-marked vulvar hypertrophies in over one-third. By one-third of this third, full admission was made, so that it is fair to attribute the findings in the remainder to the same cause, especially as categorical denial was forthcoming in only one in fifty. The above figures bear only, however, on women with pelvic disorders, in whom more or less chronic attention to the sex organs has been necessarily present. On all sides of such questions one must beware of exaggeration. "The diff'rence," says the astute Dooley, "between Christyan Scientists an' doctors is that Christyan Scientists think they'se no such thing as disease, an' doctors think there ain't annythin' else."

It cannot be too strongly stated that in a very large proportion of instances of masturbation in women the matter is a physical rather than a sexual one. It might be said to be sexless. By this is meant that sensual images and desires are infinitely less often consciously associated with the practice in women than in men. The distinction applies particularly to the intelligent classes. Among refined and delicate women, the pent-up sex hunger may take this outlet without recognition of the real meaning of the impulse, and nothing is more astounding on the part of clear minds, than the failure to make the connection between their knowledge of physiology and social practices and their genital sensations. Aversion to men is not uncommon in association with it.

Methods.—In infants the means, in nearly all instances, is thigh compression, the child being seated, and swaying its body until flushing and excitement and staring end in the deep breathing of the climax. In the worst cases the thigh rubbing is almost incessant during the waking hours. At this age the practice is far more commonly seen in girls than in boys. In girls of four or five manual friction of the prepuce is the method. Tell-tale hypertrophy of longitudinal folds and the frequent pigmentation often render the habit easy to recognize in an early stage.

After puberty the habit may be mental, vulvar, vaginal, urethral, mammary, or any combination of these. The fifth is presumably rare, but the occasional hypertrophies and pigmentations about the nipple point to breast congestion as a feature of some cases. The psychic form of solitary sexual indulgence is most difficult of all to study or describe, its shadings are so various, its ignorances of actuality so colossal. Vaginal masturbation is rare because of the fear of harming the hymen and thus destroying virginity.

The usual vulvar method is digital pressure, applied to the labia minora, or to the prepuce. To and fro sliding of these parts, hard pressed against the symphysis and descending rami of the pubes, or forward and backward over the edge of the subpubic arch, produces nerve excitation and alternate filling and emptying of the cavernous structures of the bulbs of vestibule, clitoris and labia. That the labia minora, which in their structure can be truly called erectile, are the most common point of attack, is shown by their being the most frequent seat of hypertrophy, while enlargement of the clitoris is distinctly unusual—perhaps because its make-up does not admit of the same acute edemas.

Pressure with the thighs seems as effective in producing enlargement as manualization. While sitting with crossed thighs, a slight bending forward of the trunk brings the vulva against the seat of the chair, and rhythmic adductor action produces the orgasm. In highly sensitive states the adductor rhythm alone is sufficient, and this, at times, without motion evident to any onlooker. Indeed, the extent of the need of watchfulness can never be grasped unless it is known that when self-abuse has reached its keenest pitch in certain individuals the effective pressures or frictions are so simple that a girl can reach the climax in bed with her mother without suspicion. A roll of bedclothes or nightdress held between the upper thighs, or, prone, beneath the vulva; the heel, brought up against the pudenda; vulvar contacts with the corner of a piece of furniture or the key in a drawer—any one of these may constitute an individual process. The vaginal douche tube and hot water excite very few women, and the bicycle saddle is to be exonerated; the sewing machine in large shops has, however, been accused of fostering the habit.

Time.—The usual time of indulgence is at the end of menstruation. The day or two immediately preceding the flow is the period next most fertile in temptation. Springtime brings attacks especially strong. When a pelvic disorder, such as a cervical erosion, occurs or grows worse, the torment is prone to light up again. An ordinary frequency is two or three times in the immediate neighborhood of the period, and once or twice (if at all) between. This may continue for years, while, at times, months of freedom elapse. Contrary to the usual belief, the day is as much to be feared as the night. Where a statement is made concerning twelve or fifteen conclusions in twenty-four hours, it is impossible not to believe that in most instances the climax is feeble or brief, but it must never be forgotten that women bear sexual excesses better than men—better, that is to say, physically; worse, morally. With some the solitary orgasm is said to be no more fatiguing than the normal relation, with others it is infinitely more so.

Clinical Findings.—There are certain stages and degrees recognizable in the development, and various locations, of the hypertrophies about the vulva.

Stages: Increase; full development; atrophy.

Degrees: Moderate; average; very great.

Location: Labia minora; prepuce; fourchette and perineum; accessory nymphæ; clitoris; meatus; pelvic floor and levator; vagina—eight in all, any combination being possible. To these may be added varicosities of the broad ligament and bladder base, and the mammary hypertrophies.

A typical case presents the following changes: After puberty the prepuce is a tiny tent over a small clitoris. The lesser labia are smooth and of an inverted V shape in transverse section, forming small, pink ridges closed in between the rounded cushions of the outer lips. After some months of active traction, the nymphæ are larger, thicker, darker along the outer edges, and, together with the prepuce, exhibit the simpler foldings, as well as beginning protrusions. Perhaps some area demonstrates the pathology by characteristic acute edema, showing recent trauma. Thereafter, within two or three years, the fullest development may be looked for in aggravated cases, though the *maximum findings here described as belonging to the vulvar habit are very rarely grouped in a single individual.* This virgin of eighteen, a well-developed brunette of excellent antecedents and personal history, refined, reticent, and studious, is suffering from mental and physical depression, headache, dysmenorrhea, leucorrhea, bladder irritation and menorrhagia. The breasts are large, the nipples prominent, the primary areola distinctly pigmented, elevated, and bearing follicles, with the secondary areola plainly visible. A strong growth of pubic hair covers rotund, coarse-skinned labia majora. Between these outer labia protrudes, in all postures, a corrugated roll of brown-black skin. Thickened, elongated, curled on themselves, thrown into tiny, close-set, irregular folds that cross at all angles as in a cockscomb, each lesser labium hangs in a double fold, its anterior projection partly concealing the rear portion. Unrolled, this little elephant ear, elastic and insensitive, reaches one inch, or even two, beyond the majora, and then drops back, wrinkling into deep furrows. The enlarged and prominent whitish sebaceous glands feel to the touch like a multitude of embedded sand grains. (The pigment deposit is present or absent according to the general coloring.) The prepuce, thickened and lying in rounded folds or wrinkling plaits, is continuous with these lesser labia. They unite in a sweep behind the vulva so that the fourchette and the perineal raphe are as dark and corrugated as they. Laterally, from them, two bridges of the same fine-laid furrowed folds run across the shallow sulcus that lies between inner and outer labium onto the labia majora, like an accessory or intermediate pair of smaller labia; and this duplicature hangs up or puckers the centre of each labium minus. The prepuce is partly adherent, and underneath it smegma lies hidden. The fully developed clitoris rounds its back and projects its tip under this thick cover nearly an inch in advance of the face of the symphysis. On each side a couple of prominent veins twist along the inner aspect of the labia majora. The wide meatus presents two curious ear-like flaps or tabs when drawn open. Into these ridges the forward edges of the hymen run. The openings of the vulvo-vaginal and urethral glands are reddened and gaping. The hymen is too small to admit the finger-tip. The deeply pigmented anus with its powerful sphincter is surrounded with small piles, and finally, the pelvic floor muscles are increased in vigor and thickness and in susceptibility to spasm. Vaginismus is not uncommon.

The last stage is shrinkage, with or without spotty pigment. The habit ceases. The vulva ages. Its muscles relax, and the surfaces of the lesser labia become smoother as the muscular and elastic fibers in them atrophy, but the curtain-like lips still show abnormal and characteristic increase in area, if not in thickness, and still hang in delicate folds that cross no longer. Shrivelling is never sufficient to bring them back to the former narrow ridge of projecting skin, and although the cockscomb may smooth out its surface, some of the hall marks of the aggravated habit persist for life.

Traction or friction applied to the meatus or urethra result in hypertrophies. Tiny ear-like tabs or projections of the lateral edges of the meatus—on the summit of which elongated urethral glands open—have been called urethral labia, but they are an enlarged anterior section of the hymen (urethral hymen). Dilatability or gaping of the lower third of the canal is sometimes sufficient to admit the finger-tip. A varied assortment of articles, such as hairpins, passed into the urethra to excite sensation, have slipped into the bladder, and called for surgical interference.

The vaginal habit may or may not be a later stage of vulvar excitation in any given instance. The very gradual dilatation of the hymen, extending over a long period, explains the remarkable freedom from injury and the astonishing elasticity and insensitiveness belonging to the aggravated cases of years of pelvic floor massage. Dr. R. L. Dickinson has seen at least fifteen non-parous women in whom the hymen readily yielded to a circle of six to nine inches, admitting the hand. Yet some of these hymens spring back to a closed puckered curtain which the eye cannot distinguish from the virgin maidenhead. In a later stage of the same habit, relaxation has taken place and the vulva sags open, though the woman may have had no children at term. The full-term head cannot tear these elastic pelvic floors unless its exit is precipitate. The large variety of foreign bodies which have been used to supplement the digits, or have been found in the vagina, need not be enumerated.

Effects.—The physical results of self-abuse, in all but the extreme cases, seem to be surprisingly small. Endometritis, vaginal catarrh, and trigonitis result from long indulgence. Neurasthenia is probably coincidence rather than consequence. Protracted masturbation, not associated with sexual images, tends to apathy or aversion toward the sex-act, but the contrary is true where there is longing for normal gratification. In the excessive forms of the vice, as with relaxed pelvic floors, the capacity for pleasure in coitus is lost. If the physical evils are not many, the moral penalties, on the contrary, are disproportionately great. The undermining of self-respect, the tortures and the shame react on the general health surely and frequently and deeply. But there is no diagnostic behavior or appearance.

Diagnosis.—This presents no difficulty in advanced typical cases of the vulvar habit, as described above, and in general it can, in my view, be safely said that no well-marked area of corrugation about the female genitals is produced in any way but by pressures. The minor and the mental manifestations offer troublesome problems, for which space is lacking here. After some measure of the patient's good-will and confidence has been secured, and the physician is reasonably certain of his premises, the matter may be broached if he fears there is a persisting habit. There is nothing in practice more difficult than the approach to the subject—except perhaps the retirement from it. Good women, particularly, possess no language and no terminology, either for their feelings or their anatomy. Their words, meaning much or little, are liable to any kind of misconception. The sphinx is not more silent. Secretiveness and skill of fence are developed to the highest degree. Denial springs instinctively to their lips, or professions of ignorance of what can be meant. Therefore, it is best to put through a set speech steadily. In carefully chosen words the growth of the habit in an average case is outlined, and the successful points lead the patient to think all her trouble is known. The first alarm has time to subside in assurance that this is not denunciation, but help. Admission is rarely to be asked for in adults. The warning suffices. In young girls the threat of telling the mother in case the habit is continued forms a powerful deterrent.

Preventive Treatment.—It rests with her training, not whether a girl shall be tempted, but whether she shall be enslaved by the habit. Self-control is everything, with the help of good muscle and ample nutrition, outdoor tire and cold-water sprays, elevating environment and cleanness of comrades, judicious work, and wholesome hardship. Her ideals cannot be too high, nor her conscience too alert, but the stimuli can readily be too intense. Well-timed and reiterated impact of good influences, as in church service and social service, is vital, but prolonged religious emotionalism has no stone wall dividing it from sexual agitation. Fervid preoccupation with art, music, or the literature of feeling presents dangers less gross, but not less real than contacts with loose thinking. From every excess of intensities and unsanities we shall do well to guard.

"Whatever else we may deem wise or unwise as to the instruction of the young girl in the details of sexual gratification, there can be no doubt about their teachers." The physician is the moral sanitarium directly responsible. It is for him to urge on the reserved woman what she will call the most difficult task of her life. Her telling is to be matter of fact, yet reverent; neither vague and sublimated, nor specific and suggestive; not too casual, yet not so freighted with import and interest as to arouse curiosity and invite experiment, and with just two purposes: namely, to so dispose the mind of the child that thereafter she shall bring to the mother her questionings, and to anticipate communications from the girl's companions in a matter wherein the right point of view is everything. Thus by successive stages, as the questions arise, and by illustrations drawn from plants and animals, the mother shows how the holy mysteries of sex were instituted and ordained. In the absence of researches among girls the proper age for each stage cannot yet be defined. The Y. M. C. A. camps have shown us that at from eight to ten in the tenements and from twelve to fourteen in the better houses, the boy has found out from his comrades about many sex matters. Young girls in school are sometimes surprisingly informed, and parents astoundingly ignorant of this fact. At any rate, the reckless and forward, the hysterical and passionate, the brooding and introspective should be studied and cautioned.*

Curative Treatment.—Confession, however fragmentary, is a long first step toward recovery. "Remorse for sexual sin is still the religious teacher's great opportunity." The doctor may "show great things and difficult," urge the immediate action that will break loose from the particular vicious association, start work to uplift others, and secure a promise to report. These, with strong mental suggestion of control, will go far. The issues must be clear. The lure of temptation lies largely in its intellectual vagueness. To think out the real implications is largely to loosen the habit's hold. Whereto is all this leading? The life is readjusted. House habits and work habits are studied, and nerve-wrecking tensions let go. Our motto should be, "To replace is to conquer." The taking up of an outdoor hobby, like a nature study, can bring about that muscular fatigue which is found to be the best single remedy for the male. Swimming, hydrotherapy, gymnastic games, skating, tennis, golf, wheeling and horseback—all are good, but hard to get in cities. Forced nutrition is usually needed, and a general upbuilding. Tea, coffee, and alcohol are cut off. A hard bed with minimum covering in a cool room; immediate evacuation of the bladder when first conscious, and prompt rising, followed by the cold spray or cold spinal douche, are desirable. Bromides help over crises, whatever the period of the month or the day temptation comes, and valerianates spread this quiescence further, where bromides would disturb.

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*The Wood-Allen Publishing Co.'s books (Ann Arbor, Michigan) are not condensed enough, but furnish an excellent guide for mothers. Stanley Hall's "Adolescence" (Appleton) is the best scientific presentation in English.

Actual pelvic disorder calls for cure, by the briefest means available, in order to remove the local irritant. This is right in all but the neurasthenic class. Here anatomic cure does not mean symptomatic cure, except with tumors and gross prolapses. Care is exercised to associate fear of pain with examination. Operation is preferred to office treatment or home treatment on the part of the patient. Stripping the prepuce is desirable whenever adhesions are complete or retained accumulation considerable. Circumcision is useless, except where adhesions with accumulation persistently recur.

In conclusion it may be said that whatever the divergence of opinion concerning danger or diagnosis, prevalence or effects, we can agree that there is on us the troublous duty of moral prophylaxis, the need of sane instruction of the teachers of children, formulation and comprehension of what the danger signals are, and the mastery of means that will strengthen the body and energize the will. Inasmuch as we do it not—

CHAPTER XIII.

DISPLACEMENTS OF THE UTERUS AND THEIR TREATMENT BY PACKS AND PESSARIES.

Normal position of the uterus, p. 299. Abnormal positions of the uterus, p. 300. Diagnosis and symptoms of retro-displacements, p. 304. Treatment of retro-displacements, p. 305. Packs, p. 305. Pessaries, p. 307. Operative treatment, p. 314. Treatment of prolapsus, p. 315.

Before considering the question of displacements of the uterus it is important to define briefly its normal position, because it is the only proper standard by which to measure a displacement. If my views as to the normal position of the uterus are incorrect, then I must, of necessity, estimate as misplacements a great many cases which are perfectly normal.

The older writers had the idea that the uterus must lie in one particular position in the pelvis, gently inclined forwards or slightly anteflexed, and to this norm they endeavored to accommodate all their patients. As a consequence of this false conception, great numbers of women were put upon treatment for this condition who needed none at all, and the variety of pessaries devised, particularly for anterior displacements of the uterus, was without end. With a correct notion of the posture or postures of the uterus, the vast field of anterior displacement therapy disappeared into the gynecological waste-basket, and with it the host of pessaries over which our immediate predecessors spent so much thought and wasted so much ingenuity.

NORMAL POSITION OF UTERUS.

The uterus normally lies in a state of mobile equilibrium, that is to say, it is poised or swung between its broad ligaments, ready to respond to any force however gentle exerted upon its anterior or posterior surfaces. It lies generally with fundus inclined forward, and cervix turned backwards towards the lower part of the sacral hollow. As the bladder is emptied, the fundus drops still further forward, and the uterus comes to lie in a more decided anteposition, while if the bladder becomes distended, the situation is reversed, and the body is lifted on the distended bladder; in cases of extreme distention is even thrown over into retroposition. The general position of the normal uterus is fundus anterior, cervix posterior, and as it swings in this position, the least increase of intra-abdominal pressure above forces the viscera down upon the posterior surface of the uterus and so increases the ante-displacement. No anterior position of the uterus is abnormal, except that of an extreme flexion of the body on the cervix. This is a congenital condition associated with imperfect development of the uterus and is not to be remedied by palliative treatments through the vagina, or by the use of any kind of a pessary. It is in cases of this kind that a dilatation of the cervical canal is often done, associated with a deep incision of the posterior wall of the cervix at the angle of flexure, so as to open the cervical canal and secure free exit for the menstrual discharge. Plausible as such an operation appears in the description, it unfortunately does not often relieve the dysmenorrhea which torments these patients, and although successfully done to overcome sterility, a simple dilatation of the cervix is, as a rule, equally efficient.

ABNORMAL POSITIONS OF UTERUS.

Categorically stated, the abnormal positions of the uterus are these:

Anteflexion (acute).
Retroversion.
Retroflexion.
Right lateroflexion.
Left lateroflexion.
Ascensus.
Descensus.
Prolapsus.
Torsions.
Numerous combinations of these malpositions.

Although this list of malpositions seems a formidable one, there are practically only two or three of them which are of clinical significance. These are: retroversion and retroflexion, best considered together; descensus; and prolapsus. Anteflexion, as I have said, is a congenital condition, causing in itself no symptoms and requiring no treatment. The other malpositions are either pathological varieties or dependent upon some disease of the pelvic organs.

Ascensus, or the pulling of the uterus up into the abdominal cavity, is due to an association of the body of the uterus with a tumor, such as a fibroid or an adherent ovarian tumor, growing in the direction of the abdominal cavity; or to a slinging of the uterus to the abdominal wall by a suspension operation. The displacement itself demands no particular attention.

The **latero-displacements** also are produced by the push or pull of a tumor; or by that of a pelvic inflammatory mass; or by the contraction of scar tissue in old inflammatory cases, which drags the cervix in the direction of the focus of inflammation. These conditions demand notice only as clinical features of value in making a diagnosis in connection with pelvic inflammatory trouble.

Torsions.—A slight degree of rotation low down on the right side exists commonly and may almost be considered normal. Any inflammatory disease causing an unsymmetrical drag or pull may exaggerate this. Large myomatous tumors and tumors of the ovary may cause such twisting as to completely shut off the circulation and cause gangrene. Such conditions are usually considered under tumors of the uterus or ovaries.

Retropositions are by far the most important. It is in retroversion and retroflexion, especially when associated with descensus, that the patient's general health is liable to suffer, and she experiences local discomforts; it is in these cases, therefore, that an appropriate therapy is always likely to afford entire relief.

Between anteflexion and retroflexion with descensus, the uterus occupies a number of positions, as shown in Figure 81. If a case is watched from the first, these steps on the backward and downward progress may be recognized, even to its final appearance at the outlet and its escape as a complete prolapsus.

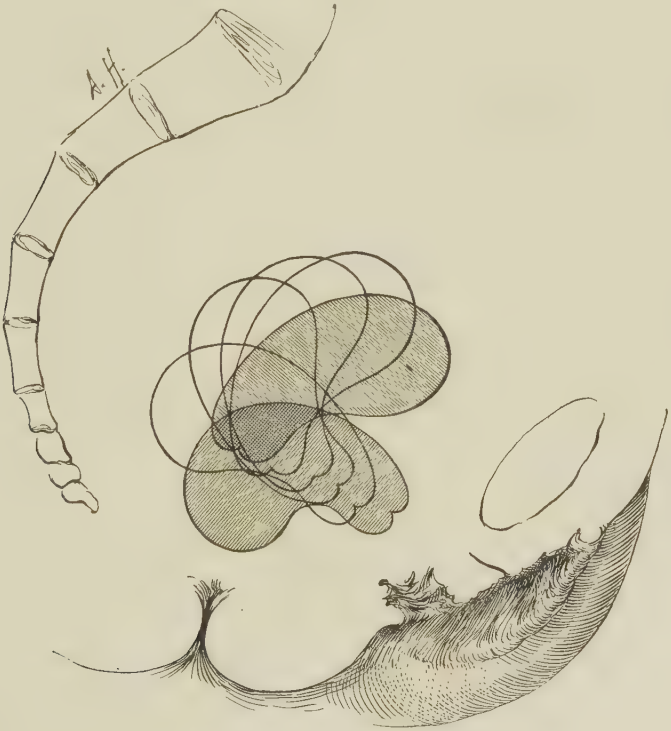


Fig. 81.—Different Degrees of Uterine Displacement, from a Normal Slight Anteflexion to a Decided Retroflexion with Descensus.

Frequency of Retroflexions.—The relative frequency of retroflexion, as contrasted with other gynecological ailments, is found in the following statement taken from my records at the Johns Hopkins Hospital: Out of the thirteen thousand and six hundred gynecological cases, there were eleven hundred and eighty-six of retroflexion, and of this number four hundred and fifteen were uncomplicated retroflexions, three hundred and sixteen being associated with pelvic adhesions, a broken-down vaginal outlet (commonly called laceration of the perineum), appendicitis, etc.,

Out of one thousand operations of all kinds, extending from August 27, 1904, to November 9, 1905, there were ninety-five cases of retroflexion; of this number sixty-nine were married women and twenty-six were single. In ten per cent of the ninety-five cases an operation was done upon the vaginal outlet.

Varieties of Retroflexion and Retroversion of the Uterus. —These forms of displacements differ according to whether they are found in nulliparæ or in parous women. In the nulliparous woman and in the virgin, a tilting back of the uterus is not infrequently found, in which the uterus lies, as it were, reclining in the sacral hollow, as one rests at ease in a rocking chair. If there are no symptoms of pelvic pain, irregular catamenia, and dysmenorrhea, such displacements do no harm whatever, and ought not to be treated. Where the vagina is preternaturally short a retroflexion must be considered as the normal position for the uterus (see Fig. 82). There is no doubt at all that thousands of young women are under treatment for retrodisplacements, impressed by their physicians that it is a serious malady, who would be far better off if they were let entirely alone, or if the time and money expended were directed to the simple endeavor to build up their health. At the same time there are occasional cases in young women, in which there is a marked downward displacement, with the fundus of the uterus tilted backward, and often associated with a misplaced ovary, where there is a distinct dragging pain and a marked dysmenorrhea. In such cases where the symptoms are distinctly local and clearly referable to displacement, great relief generally follows replacement of the uterus. It is the cases of neurasthenia, with more or less general aches and pains, and suffering which seems more particularly ovarian in character, that are rarely relieved by mechanical methods.

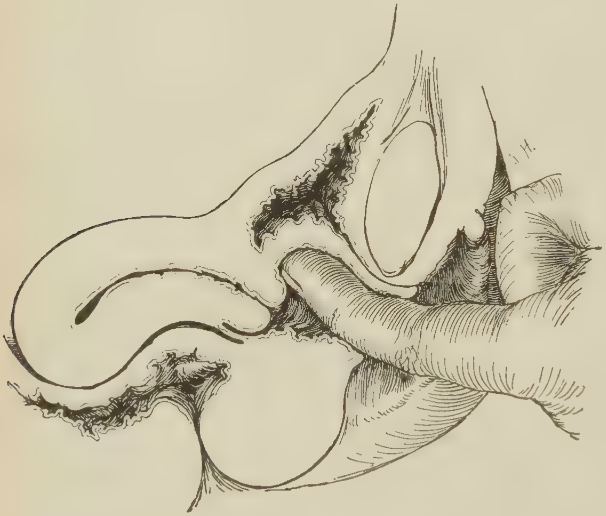


Fig. 82.—A Retroflexion which is Natural and cannot be Corrected on Account of the Abnormally Short Vagina. The anterior fornix, although it can be pushed up and lengthened, is not much longer than the first joint of the finger.

Retroflexion in a woman who has borne one or more children is associated with a relaxation of the broad ligaments, and with a rupture at the vaginal outlet, involving the levator ani fibres, and leaving the outlet gaping, with more or less eversion of the anterior and posterior vaginal walls. The cervix in such cases is at a much lower point in the vagina than is normal, in fact that conditions seem almost reversed. The cervix lies forward, one or two finger breadths from the symphysis, while the fundus lies backward, low down in the sacral hollow, where the cervix formerly lay. The examination in such a case is not completed until the patient is examined while standing, with one of her feet resting on a low stool. While in this position, on making the least strain, the vaginal walls are felt to roll out, and the cervix is found to descend lower in the vagina.

Prolapsus of the uterus is simply an advanced stage of this retrodisplacement just described, associated with descensus, which is the first step towards the formation of a complete prolapse. A complete prolapse, or escape of the entire uterus from the pelvic cavity, is rarely brought about within a short period of time; as a rule, the descensus increases week by week until the cervix appears at the vaginal outlet, and next escapes from the outlet, until finally the entire uterus, or, it may be, a long drawn out supravaginal cervix, like a stem of macaroni, communicating with the body above, hangs between the thighs (see Fig. 83), at the apex or on the anterior surface of a sac made up of vaginal walls, containing a diverticulum from the bladder in front, and it may be some projection of the rectum or the small intestines behind.

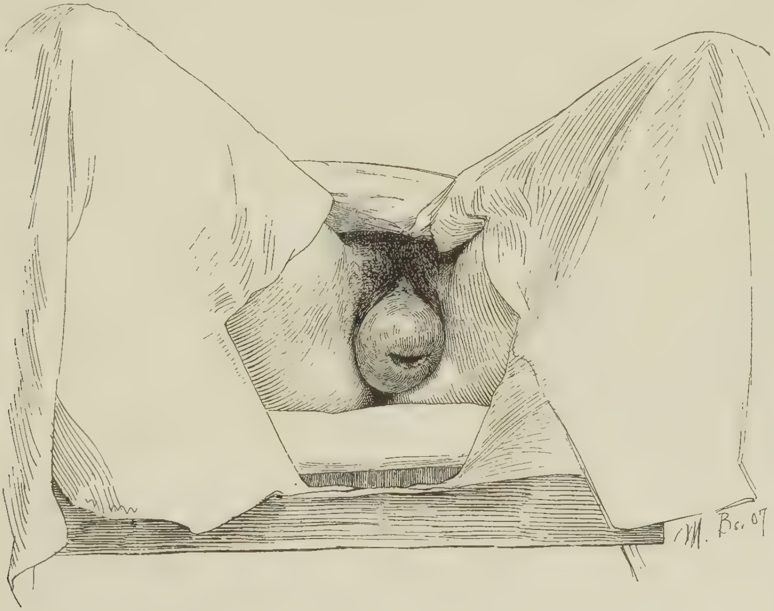


Fig. 83.—A Case of Complete Prolapse of the Uterus with both Vaginal Walls. The vagina, with the cervix, hangs like a bag between the thighs.

The pain present in these cases is most aggravated when the prolapsus is in the process of formation, while the dragging is still going on, and the tissues are yielding. When the prolapse is completed, although the patient may be greatly incommoded by the mass, the sacropubic hernia, which hangs between her thighs, the suffering is not so great, as there is no longer any stretching going on.

Prolapsus is usually found in women well over forty, no longer in the child-bearing period, so that for this as well as for mechanical reasons, pregnancy is extremely rare. The chief dangers in this condition are associated with the difficulty in emptying the bladder. Cystitis may occur, stones may be formed in the sacculus lying in the hernia, and an ascending infection may cause death. As a rule, however, there is but little danger to life.

Symptoms and Diagnosis of Retrodisplacements.—A retroflexion is objectionable because of the disabilities it induces. The patient who was once active and energetic now feels more or less tired all the time, has a dragging sensation generally referred to the brim of the pelvis posteriorly, is apt to suffer from constipation and prolonged menstruation, and is often seriously incommoded by frequent urination. If pregnancy occurs, an abortion is apt to take place; although in favorable cases, the uterus rights itself, and after the third or fourth month there is no further difficulty, but rather a relief. If the retroflexed pregnant uterus becomes incarcerated and unable to escape from the promontory up into the abdomen, as a rule, an abortion takes place. This is the simplest and safest solution. Sometimes the pressure is so great as to occlude the urethra and cause an exfoliation of the vesical mucosa. A simple manual replacement, with the patient in the knee-breast position under anesthesia, in which the cervix is pulled down towards the outlet, while the fundus is pushed up with two fingers introduced into the emptied rectum, will at once relieve all discomforts and place the uterus in a position to carry its burden to term.

The diagnosis of retrodisplacement is made by feeling the cervix lower down in the vagina than its normal position, instead of lying well up at the vault, while the rounded fundus is easily felt through the posterior vaginal vault (see Fig. 81, p. 301). The rounded mass at the posterior vaginal vault must be distinguished from an ovarian tumor or a fibroid tumor of the posterior surface of the uterus. This is done in the first place by grasping the cervix with the tenaculum forceps and drawing it down, while the finger distinctly recognizes the continuity between the cervix and the fundus in the angle posteriorly. Then upon making a bimanual examination, with one hand palpating through the abdominal walls, the absence of any fundus anterior to the cervix is noted, while at the same time the fundus felt below can be pushed up so as to come within the reach of the abdominal fingers. If there is any doubt about the condition, a little anesthesia will enable the operator to make a still more searching examination bimanually through the rectum and the abdominal wall, bringing the finger into the closest contact with the posterior surface of the uterus, and enabling him to outline the ovaries at either side.

In examining a young woman with an intact hymen, it is always best to spare her feelings and suggest an anesthetic at once, to clear up the situation. I find as a rule that nitrous oxide gas is sufficient for this purpose; if it does not produce enough relaxation, a little ether may be given. Where an anesthetic is objectionable, a ten per cent solution of cocain may be inserted by the nurse, upon a pledget of cotton attached to a thread placed just behind the hymen; this measure obliterates the sensitiveness, after which the examination can be made with far less distress and resistance on the part of the patient. The examiner ought always to avoid any injury to the hymen. This can be done by conducting the entire examination through the rectum. It is my rule in such cases to suggest to the patient, if she has been complaining of dysmenorrhea, that any simple operation, such as a thorough dilatation, should be done at once, so as not to subject her to the discomfort of two acts of anesthesia.

Treatment of Retrodisplacements.—The treatment of a retrodisplacement may be either palliative or radical. Among the palliative treatments must be reckoned the application of packs to the vagina, with a view of holding up the uterus, and the use of pessaries for the same purpose. Radical treatments are operative in character. A vaginal pack, or tampon, is made of large pledgets of absorbent cotton or wool, or of a long strip of gauze (see Fig. 84) saturated with some drug, and introduced into the vagina, where it forms

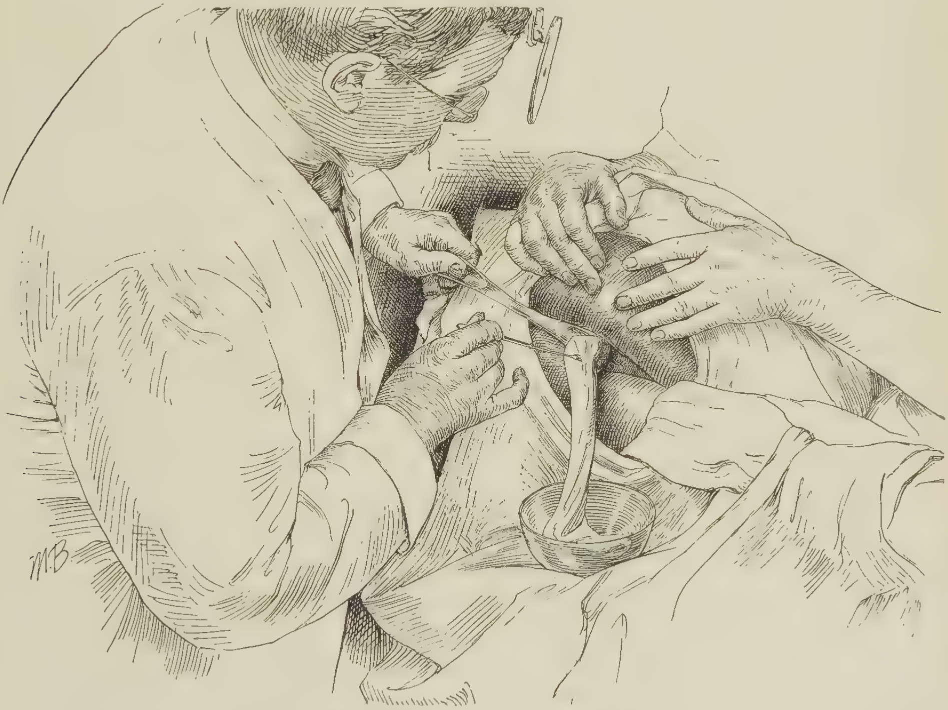


Fig. 84.—Showing Manner of Applying a Gauze Pack to the Vault of the Vagina by Means of a Packer, for the Purpose of Holding the Uterus up and in Place.

a supporting column, holding up the uterus. The medicament most commonly used is a solution of boric acid in glycerin, called boroglycerid. A teaspoonful of this is laid in a piece of absorbent cotton, shaped like a little saucer, attached to a thread. This is then placed at the vaginal vault under the cervix with a thread hanging outside. One or perhaps two or more pledgets of cotton are similarly introduced, using an instrument called a packer, to carry the cotton up into place. Underneath the pledgets of cotton it is well to place a tampon of wool, which does not collapse like the cotton, and gives an elastic support to the whole. Such a tampon should be left in place from twelve to twenty-four hours, after which the patient removes it and takes a douche, using permanganate of potash, two to three per cent, in warm water for the purpose; or a teaspoonful of Labarraque's solution, the formula for which is as follows:

℞ Liq. sodæ chlorinatæ .... ʒj
Aquæ .... Oj
M. S. Use as a vaginal douche.

Such packs may be renewed from week to week, the douching being continued in the intervals. A pack is not to be left in for several days, as it is liable to become sour and to set up irritation. A good plan of putting in a pack is to place the patient in the knee-breast position and lift up the perineum, when the whole vagina balloons out, and it is much easier to place a suppository or a supporting pack in position. The cervix should be drawn down with a tenaculum, so as to dislodge a non-adherent fundus or to gain as much room as possible, should it be adherent. The action of the pack is for the boroglycerid to provoke a free watery discharge and thereby deplete the surrounding tissues, while the cotton and wool form an elastic supporting column within the vagina on which the uterus rests, preventing displacement downwards when the patient is on her feet and propping the distended walls of the pelvic blood vessels, thus giving the patient a sense of relief. I sometimes see patients who have become accustomed to the use of packs where no displacement or anatomical abnormality of any kind whatever can be detected. Such patients, who have worn packs a long time, experience a sense of discomfort without them, and unless a strong effort is made to wean them from the practice, they are likely to remain tied to the doctor's office from year to year. Cases of this sort, where there is really no trouble demanding the pack, are a disgrace to the gynecological profession.

Pessaries in Retrodisplacement and Descensus.—Pessaries are valuable instruments in giving relief in cases of retrodisplacement, or descensus, or both. As a rule, their use is only temporary, for a few weeks or months, when an appropriate operation should be done so as to free the patient from the necessity of local treatment. Sometimes, however, as in prolapsus in an older woman who has a serious organic disease, such as a heart lesion, and an operation is contra-indicated, a pessary is used permanently to keep up the uterus and vaginal walls. The various forms of pessary are shown in Figure 85.

Pessaries ought always to be made of hard rubber. Soft rubber should be discarded, as it becomes foul and provokes vaginitis. The hard-rubber pessaries may be left in place for periods varying for from several months to a year. The operator should be sure when the pessary is introduced that it is perfectly clean. A pessary should never be taken from one patient and, after simple washing, introduced into another. The ring pessary alone of all the different kinds can be disinfected by boiling in water. Other pessaries, which are liable to lose their form by boiling, should be washed with soap and hot water and then immersed in a solution of bichloride of mercury for several days. The use of the pessary is simply to spread out the vaginal walls. When the uterus is freely movable, it may be put in a normal position before

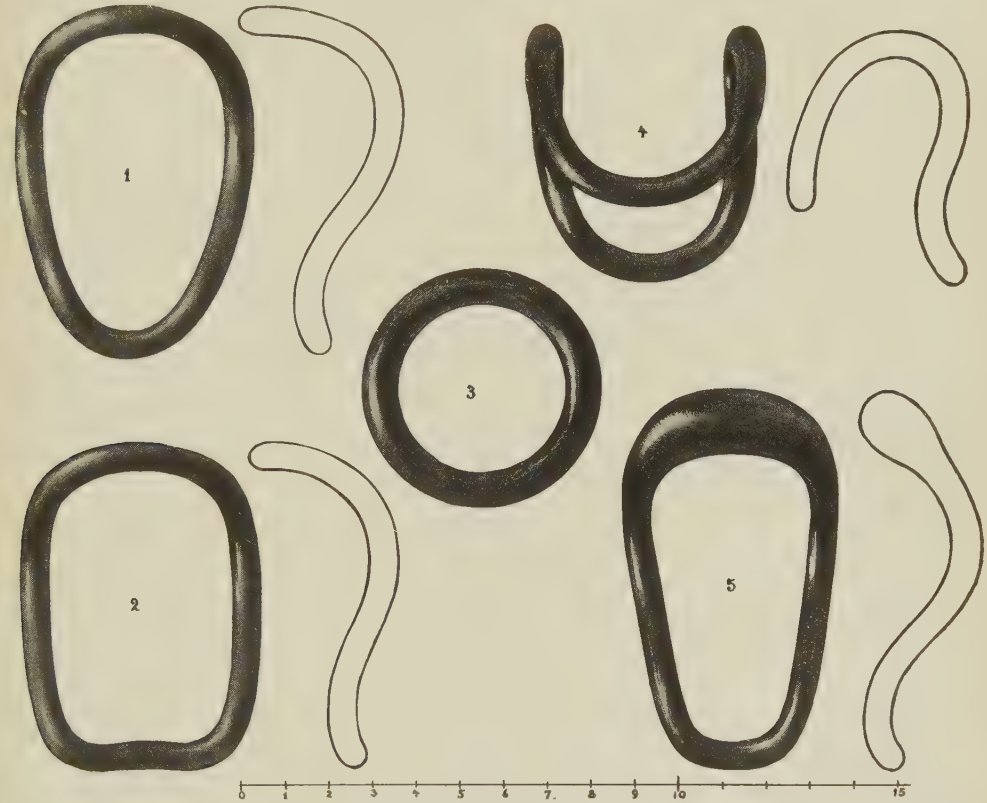


Fig. 85.—The Five Most Useful Kinds of Hard-rubber Pessaries. Their Size is Slightly Reduced as shown by the Centimetre Measure Below. (1) Smith pessary with strong upper curve of the posterior bar and pointed nose. (2) Hodge pessary with broad anterior bar; the curved form of the pessary, seen from the side, is shown on the right. (3) Common hard-rubber ring pessary, the most generally useful of all. (4) Gehrung pessary, the most valuable form in cases of cystocele, and in prolapse where the vaginal outlet is still good; the outline of this pessary is shown on the right. (5) Reinforced Mundé-Thomas-Smith pessary. Thomas added the thickening of the posterior bar to the Smith pessary (1); while Mundé changed the pointed nose of the anterior bar into a broader one, more like the Hodge form. All these pessaries are made in several sizes.

a pessary is placed. A measurement should be made of the length of the vagina, by means of the finger or a sound, from the upper limit of the posterior cul-de-sac down to the posterior surface of the symphysis at a point corresponding to the junction of the lower and middle thirds of the urethra, in order to determine the length of the pessary to be used.

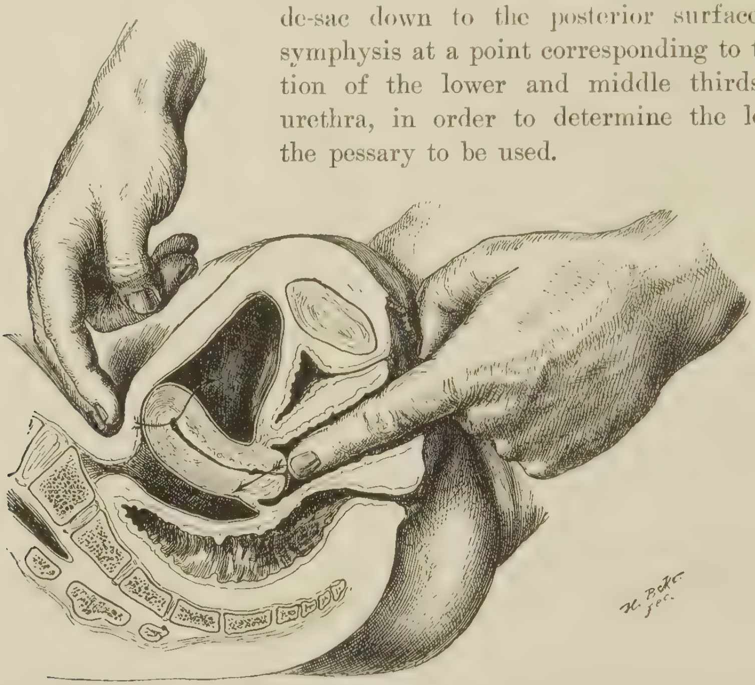


Fig. 86.—Showing Method of Bimanual Reposition of a Retroflexed Uterus. Note index finger of left hand pushing the cervix forward, while the right hand presses upon the posterior surface of the fundus uteri.

Manual Reduction.—Let me say here that manual reduction of the uterus, while it seems an ideal procedure as it appears on a diagram, lacks two important elements of the ideal in actual practice. In the first place it is not always easy to accomplish and may hurt the patient a good deal; in the second place, a uterus so replaced, as a rule, refuses to stay where it has been put. For this reason, I do not pause to lay great stress on this phase of the treatment of retrodisplacements. The replacement is effected by getting hold of the back of the fundus with the hand on the abdomen (see Fig. 86), at the same time pushing the cervix back with the finger of the other hand, in this way assisting the organ to reach its normal fundus-ante position. After replacement it is well to exaggerate the anterior position decidedly before putting in the tampon (see Fig. 87).

It sometimes happens that the simple introduction of a pessary sets a retroposition of the uterus into anteposition. Before introducing the pessary the vagina should be clean and the bowel free of fecal matter. The well-lubricated pessary is then placed inside of the vagina, encircling the cervix as if it is a ring, and this may be done without attempting to raise the fundus; the pessary itself will often serve to correct the retroposition of the uterus, if its presence is sufficient to maintain the uterus in a correct position. The essential conditions for the use of a pessary are the absence of a lateral inflammatory disease, which would be aggravated by the hard sides of the pessary, and a vaginal outlet sufficiently closed or snug enough to keep the pessary within the vagina. If the vaginal outlet is much broken down, any pessary, however well placed, will roll out as soon as the patient is on her feet, or with the first act of straining.

There is one pessary, the Gehrung, which will correct an eversion of the anterior vaginal wall, called a cystocele. The pessary is held in the fingers, as shown in the diagram (see Fig. 85, No. 4), and inserted by hooking it down over the perineum, and then rotating it gently till the entire pessary is brought within the vagina. It is then turned with the index finger, pressing on one or the other of its bars until the cervix comes to lie in the position shown in the diagram. Other pessaries commonly used are the simple ring (Fig. 85, No. 3) in sizes from four to ten centimetres in diameter; and the rubber ring, which should be about ten millimetres in thickness; it is a serious mistake to use rings made of narrow rubber less than six millimetres in thickness, as these are more liable to cut through the vaginal walls. Whenever there is some tendency to prolapsus, it is better to use rings with thicker margins, and in prolapsus, a disc of rubber is often valuable, with simply a little hole (one to two centimetres in diameter) in the middle. In such cases a shell pessary is often useful. I believe, as a rule, hard-rubber rings will serve all the purpose

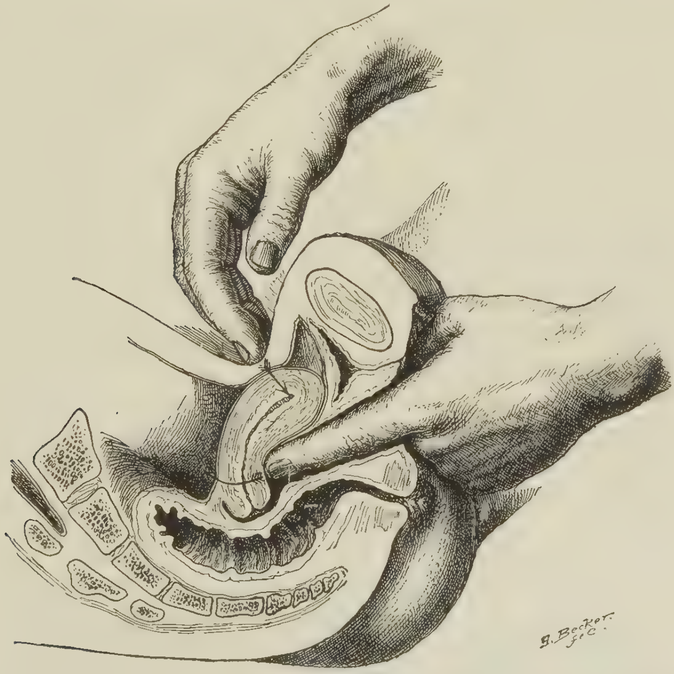


Fig. 87.—Shows an Exaggeration of the Normal Anteflexion of the Uterus, Produced by Bimanual Manipulation.

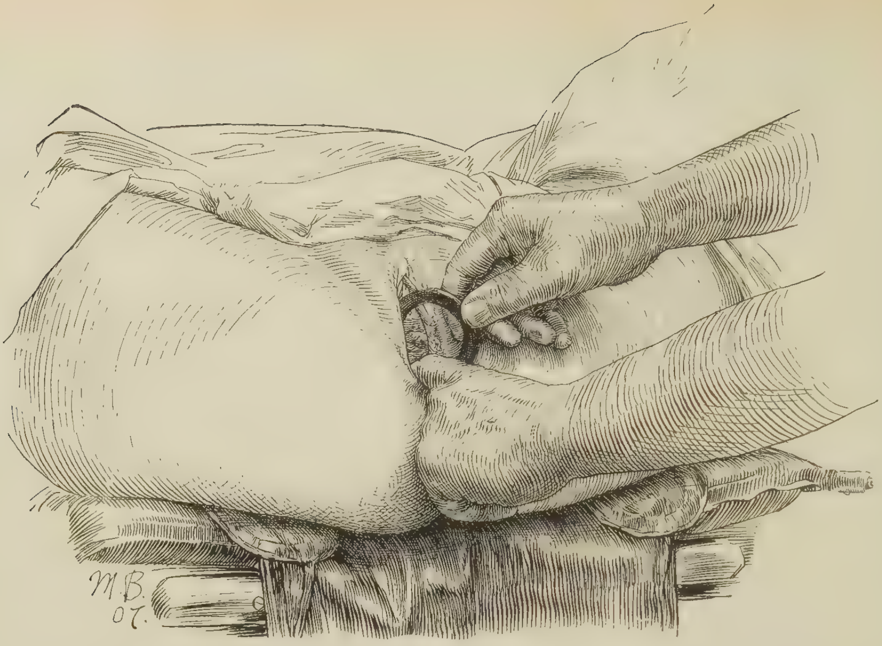


FIG. 88.—SHOWING MANNER OF INTRODUCING A RING PESSARY, BY DRAWING BACK THE POSTERIOR VAGINAL WALL AND PRESSING BACKWARD WITH THE PESSARY AS IT IS INTRODUCED IN A SLIGHTLY OBLIQUE DIRECTION. It is important to avoid pressing upon the pubic bone or the more sensitive structures near the symphysis.

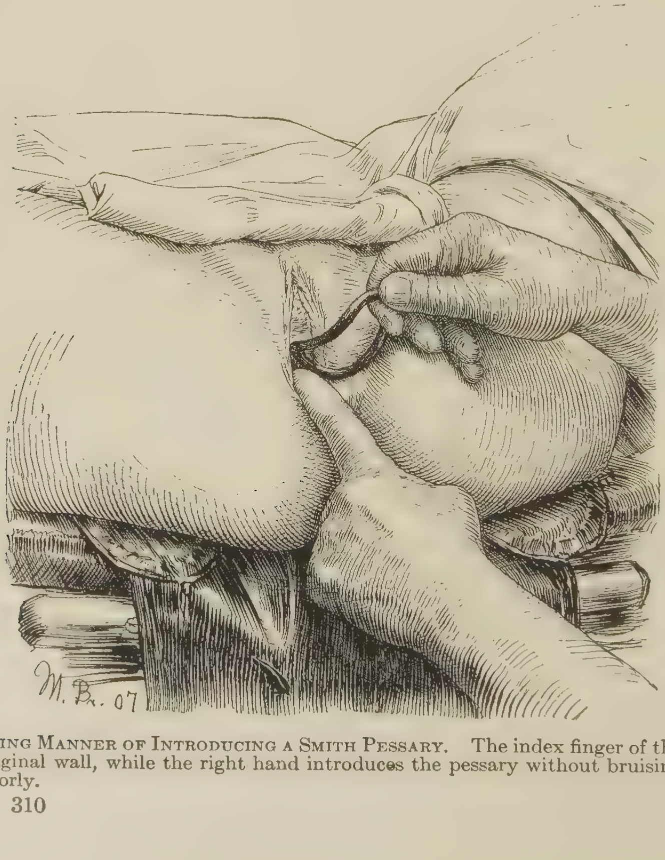


FIG. 89.—SHOWING MANNER OF INTRODUCING A SMITH PESSARY. The index finger of the left hand pulls back the vaginal wall, while the right hand introduces the pessary without bruising the structures lying anteriorly.

and fulfil nearly all indications better than the so-called lever pessaries, known as the Hodge, Albert Smith, Smith-Thomas, Smith-Thomas-Mundé (Fig. 85, No. 5). When a lever pessary is used in retroflexion, the broad posterior bar of the Thomas pessary is more satisfactory than the old-fashioned Smith, while the same pessary with a square nose in front is more satisfactory than the pointed nose of the Albert Smith pessary. The pessary ought never to stretch the walls of the vagina so as to produce an ischemia. It is a temptation, it appears, to many physicians to insert a large pessary, of the style which I have long called a Horse Pessary; this stretches the vaginal walls out tremendously in every direction, producing a result which would be very satisfactory if the instrument did not lie in contact with living tissues liable to ulcerate. A pessary should fit snugly, but rather loosely, although not so loosely as to be unable to keep its position. There should be room on all sides to insert a finger easily between the pessary and the vaginal wall. If it is uncertain what kind of a pessary to use, it is best to start out by trying a ring. Then if this does not do well, to try, say the Smith-Thomas-Mundé. The ring pessary is inserted in the manner shown in Figure 88, pushing posteriorly against the perineum, and avoiding any violent impact on the urethra or the anterior vulvar tissues. The Smith or Mundé pessaries are held and inserted in the manner shown in the diagram (see Fig. 89). After thus slipping the pessary into the vagina, it is put in position by the index finger pressing the posterior bar back behind the cervix (see Fig. 90). The whole pessary should then lie well within the vagina and behind the symphysis, and no part should be visible at the vaginal outlet. Figure 91 shows ring pessary in position.

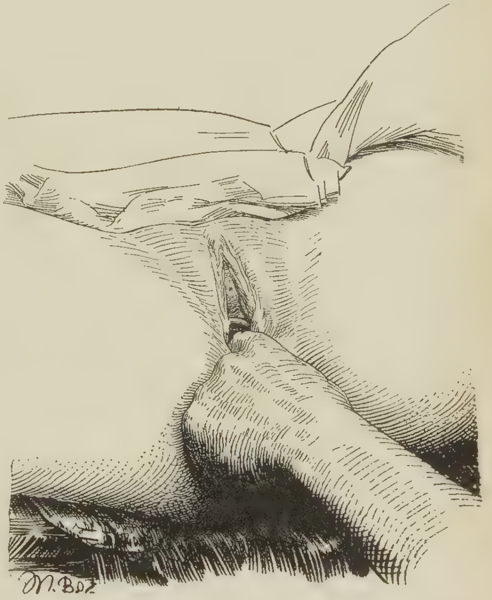


Fig. 90.—Showing Manner of Carrying Smith Pessary into Place. The pessary, having been introduced into the vagina, is caught by the index finger, which rests upon its posterior bar, and carried well behind the cervix, when the pessary is in position.

The thick ring pessaries, the disc pessaries, the shell pessaries, and the bayonet handle pessaries (Menge) should be reserved for prolapsus cases. In these cases, the pessary must be larger, as a rule, than for retroflexion, so as to take up more space in the overstretched vagina, and at the same time too large to escape through the vaginal outlet when once introduced. The simpler the form of pessary which does the work, the better for the patient. Sometimes a pessary seems to fulfil the indication in an ideal manner, so long as the patient is on her back, but as soon as she gets on her feet, the part lying behind the symphysis slips down, appears at the vulva, and so escapes. The physician here realizes that, if in some way he could prevent the pessary falling forward in this manner, he would be able to keep it inside, and so give entire relief. This indication was met by our predecessors by the Zwank pessary, an instrument which could be introduced closed and then opened out by means of a screw arrangement in the handle. These pessaries, however, did incalculable harm in cutting through into the tissues, and have, for this reason, fallen into a well-deserved disrepute. This indication is well met by the Menge pessary, with a rounded stem, which is inserted into the pessary and fixed with a bayonet lock after the pessary has been introduced (see Fig. 92). Pessaries cause abrasion or ulceration of the vagina because they are too large and exert undue pressure in one place, or because the polished surface of the hard rubber becomes incrusted with lime salts and thus roughened. To guard against this roughening and to make sure that the pessary fits well, it should be removed and inspected after each menstrual period for several months, and thereafter at intervals of two or three months during the time it is worn.

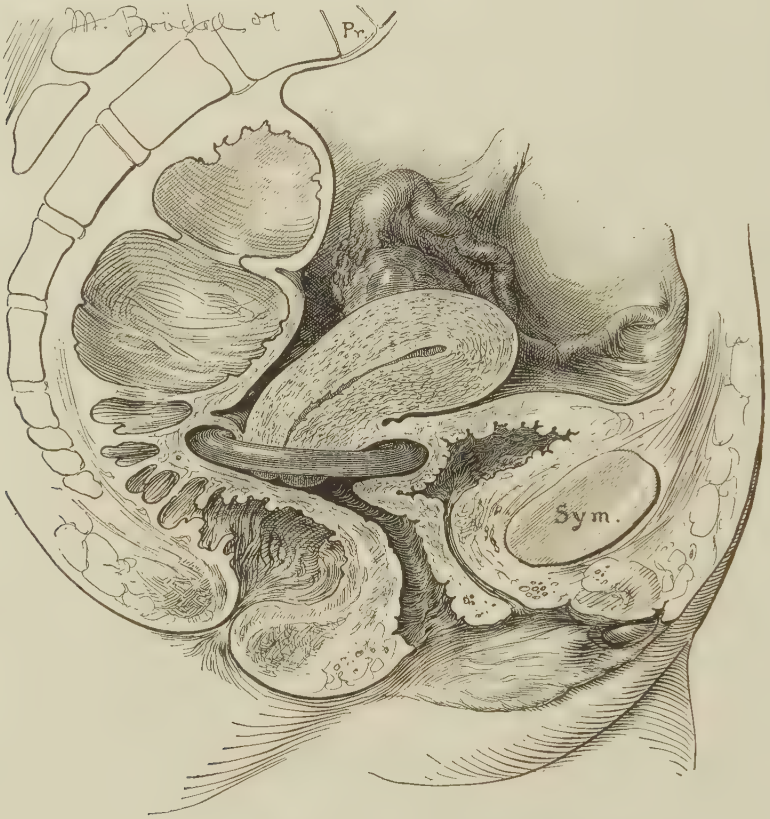


FIG. 91.—SHOWING A RING PESSARY IN PLACE, AND ITS RELATIONS TO THE CERVIX AND THE VAULT OF THE VAGINA.

In fitting a pessary it is often necessary to bend it. To do this without destroying the polish it must be thoroughly greased and held just above the flame of an alcohol lamp, taking care not to let the grease catch fire, for if it does the rubber will burn, leaving a rough spot.

Patients who wear pessaries find it necessary, as a rule, to use douches; a good douche is made of sodium bicarbonate and borax, a teaspoonful of each to the pint of warm water, which can be taken once a day injected with a Davidson's syringe, using the long hard-rubber nozzle introduced to its fullest extent into the vagina. If a drop of menthol is added to this and thoroughly mixed with the powder before dissolving, the douche is more refreshing.

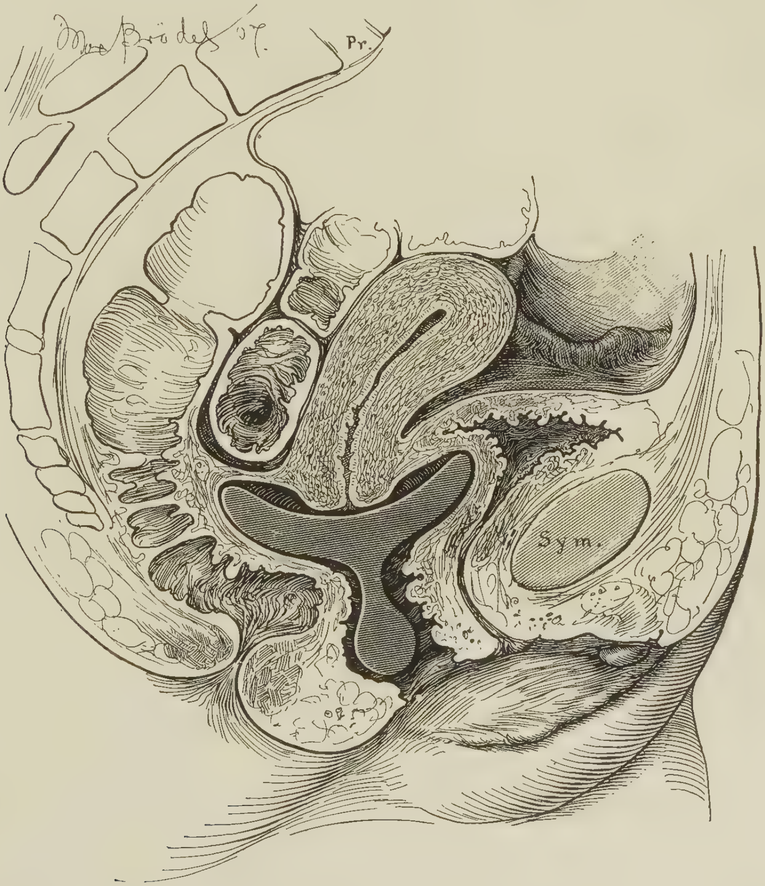


Fig. 92.—A Form of Pessary (Menge) Useful in Some Cases of Prolapse of the Uterus. The stem prevents the pessary from rotating and thus from presenting at the vaginal outlet and escaping.

℞ Menthol	gtt.j
Sod. bi-carb.	ʒj
Sod. bi-borat.	ʒj

S. Dissolve in a pint of hot water and use as a douche.

Vaginal suppositories of boroglycerid and gelatin plain or combined with hydrastis, ichthyol, tannin, or alum, are often useful in place of the douche.

Operative Treatment.—The radical or operative treatment for retrodisplacements consists in the use of natural or artificial supports to hold the uterus in an anteposition and keep the fundus forward in advance of the cervix. The simplest form of operation is that used in nulliparous women where one of several supra-pubic operations may be employed. The Alexander operation acting on the round ligaments by shortening them in the inguinal canal has long been in vogue, but it is at present being generally abandoned.

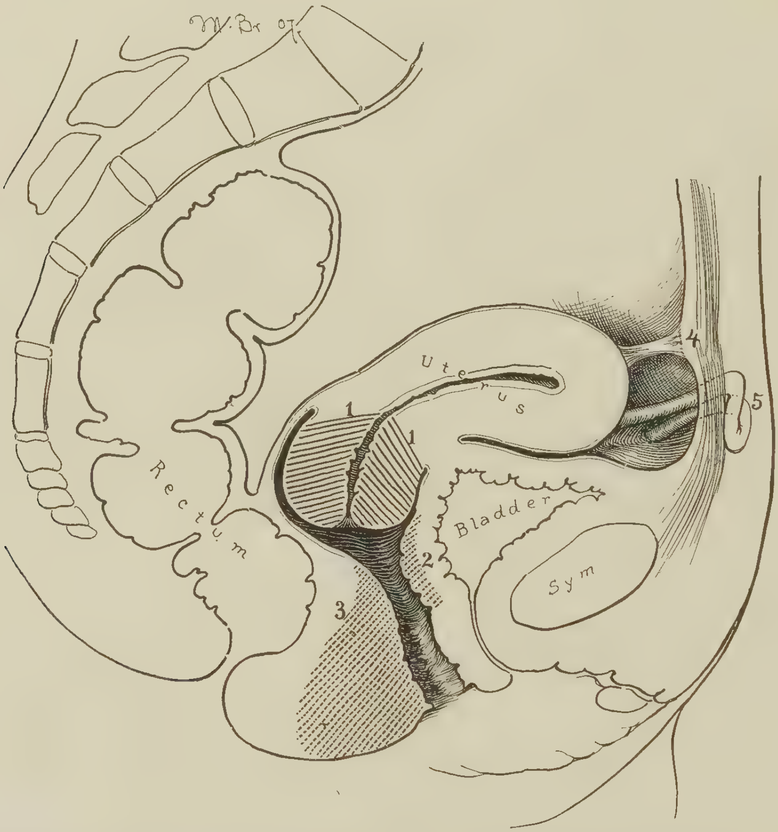


Fig. 93.—Shows the Different Steps in an Operation for Prolapse of the Uterus. (1) Represents the amputation of the cervix by removal of the area indicated by shading. (2) Represents the resection of the anterior vaginal wall for correction of the cystocele. (3) Shows the operation for building up the vaginal outlet and thus narrowing the opening. (4) Is the suspensory ligament attaching the fundus to the abdominal wall. (5) Represents the alternate operation to this, namely, the shortening of the round ligament by Gilliam's operation.

The advisability of such an operation belongs to a specialist, but the general practitioner must judge what cases it is desirable to send him for advice.

For the information of the physician, I have indicated two of the forms of operation used for the correction of an extreme prolapse. In one, the simpler, the cervix, which, as a rule, is elongate, is amputated (see Fig. 93, 1) then the anterior vaginal wall is resected (Fig. 93, 2); and, finally, the vaginal outlet is built up so as to give a strong support to the outlet (Fig. 93, 3). An abdominal operation may be added to hold the vagina forward, either by direct action of the fundus, or by drawing the round ligaments through the abdominal wall (Gilliam's operation). In the other forms of operation, which effectively holds the uterus in place in even the most difficult cases, the body of the uterus is brought out between the bladder and the vagina as shown in Figure 94. After this the vaginal outlet is built up as in the operation shown in the previous figure.

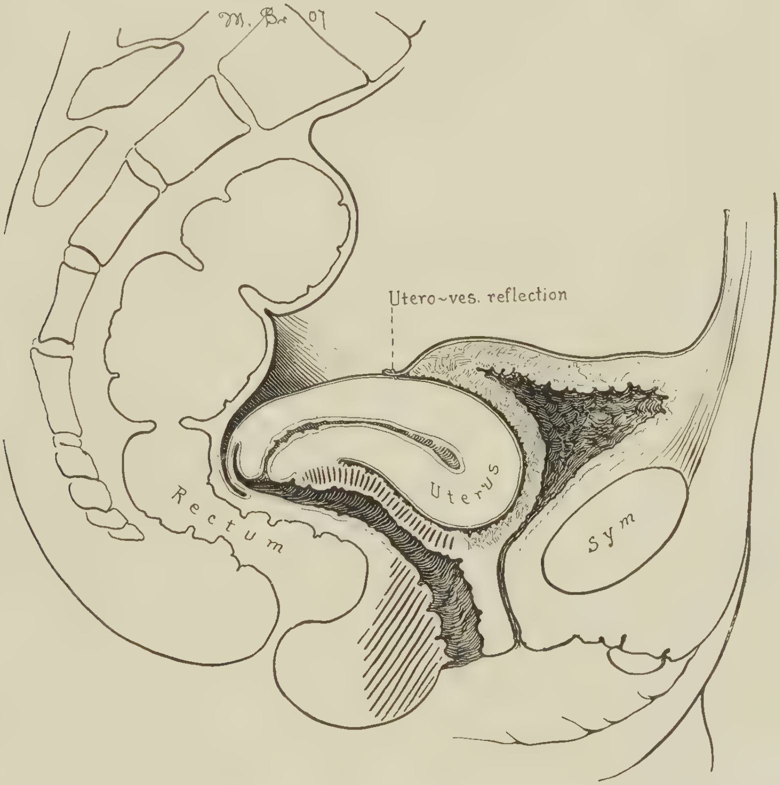


FIG. 94.—AN OPERATION FOR THE CURE OF PROLAPSUS IN WOMEN WHO HAVE PASSED THE CHILD-BEARING PERIOD AND WHERE THERE IS A MARKED CYSTOCELE. The uterus is intercallated, or fixed between the bladder and the anterior vaginal wall. The shaded area in the perineum represents the customary closure of the relaxed opening.

Treatment of Prolapsus.—While retroflexion and simple relaxation of the vaginal outlet are easy, prolapsus is often exceedingly difficult to cure. The flaccid vaginal walls, with a loose uterus above, are apt to roll out of the best-formed vaginal opening, as a wet glove is turned inside out. In almost all cases of prolapsus, a series of operations is necessary to effect a cure. I have already spoken of the three forms of pessaries in use in this condition, and when they do afford relief in women of advanced years, especially in those who are very stout, it is far better to use them than to resort to any more or less aggressive treatment. A pessary cannot be used successfully, however, unless there is a more or less well-formed outlet to hold it in. If there is a fairly good outlet, then it is worth while to spend some little time in persevering effort to find a suitable pessary.

Whenever there are ulcerations on the everted vaginal mucosa, the uterus and vagina ought to be pushed back into the pelvic cavity and the ulcerated surfaces treated by inserting glycerin tampons, and keeping the patient in bed until they are healed (see Fig. 84, p. 305). Each time the tampon is removed a prolonged hot douche is given, six quarts of water as hot as can be borne at a temperature of 110° to 116° F., given by means of a fountain syringe, after which another pack is inserted. If the bladder is affected with cystitis, as sometimes happens, it should be treated by daily irrigations with a boric acid solution of half saturated strength, as hot as can be borne. A good way to do this is to attach a funnel with a long rubber tubing to the end of the catheter and after filling the funnel with the solution, raise it two to three feet above the level of the patient as she reclines on her back. Let the fluid run into the bladder until the patient complains of great discomfort, then pinch the tube, and disconnect it from the catheter. Care should be taken not to let any air go into the bladder, as it is apt to produce distress. If the progress towards recovery is not rapid enough, the boric acid solution may be alternated with one of hot nitrate of silver, 1:1000 in strength. Should these means fail to give relief the patient must be referred to a specialist with a view to operative treatment.

CHAPTER XIV.

PELVIC INFLAMMATORY DISEASE.

Definition, p. 317. Etiology, p. 318. Varieties, p. 318. Diagnosis, p. 319. Treatment, p. 323.

DEFINITION.

The term "pelvic inflammatory disease" is applied to an extensive group of affections of an inflammatory nature, involving the pelvic viscera. The result of such an inflammation is the agglutination of the contiguous viscera, often associated with the formation of localized swellings, consisting of abscesses or accumulations of serum, which are walled off from the rest of the abdominal cavity above. These affections are so exceedingly common that they are seen by every general practitioner, and their treatment forms a large part of the surgical work which the gynecologist is called upon to do. The group of pelvic inflammatory diseases is subdivided into a number of specific affections, each one of which tends to differ from the others in its mode of onset, in its course, and in its termination; the group as a whole, however diverse its causes, is united by one peculiarity, namely, that of inflammatory reaction, which results in the formation of adhesions between the inflamed structures and the circumjacent peritoneum.

In the first broad analysis of the subject inflammatory affections may be divided into two sorts: one which is infectious, resulting from the invasion of pathogenic organisms; the other which is non-infectious and results from the irritative action of some chemical product, either of the uterine tubes or of the ovaries, upon the peritoneum, provoking an inflammatory reaction without the formation of pus.

The non-infective cases of pelvic peritonitis, as a rule, arise from the ovaries (excepting in the case of a tubal hematocele); the most conspicuous cases of this class are the extensive hematomata arising from diseased corpora lutea. The blood poured out under these circumstances provokes violent adhesive inflammation in the surrounding peritoneum, in which both ovaries are usually involved, being walled in by the dense attachments of the uterus, tubes, and bowels to one another.

The infectious cases, in most instances in which the avenue of invasion can be detected, are traceable from the uterus upwards, through the uterine tubes, and so onto the peritoneal surfaces. They differ from the non-infective, above cited, in that their chief seat is in the uterine tubes, which may show extraordinary changes, becoming converted into serous or pus sacs (sacto-salpinx), sometimes of great size.

ETIOLOGY.

The inflammation, whatever its cause, is usually traceable to a definite focus where it resides at first, and from which it extends intermittently to the surrounding structures. The focus is generally manifest in the greater intensity of inflammation, and the greater density of the adhesions at this point. It is important to note the fact that while the organ which forms the focus of the disease is often injured beyond the possibility of restoration, the adjacent organs are frequently only incidentally affected, being involved in the adhesions resulting from the pelvic peritonitis, and although affected, often not seriously injured structurally.

The chronic forms of pelvic inflammation, which are seen for the most part by the gynecological specialist, have, as a rule, been progressing for months, and frequently for many years; they are often ambulatory, visiting one office after another, and clinic after clinic, seeking relief.

The acute florid forms, on the other hand, are oftener seen by the general practitioner, who is called in where there is a fresh gonorrhea, and in the first attack of pelvic peritonitis; or again, he sees his patient through her confinement, and then watches the development of a phlegmon on the pelvic floor, or a peritonitis in the puerperal period.

VARIETIES.

The following forms of pelvic inflammatory disease are those commonly seen:

Gonorrheal infection.
Puerperal infection.
Tubercular infection.
Corpus luteum cysts.
Ectopic pregnancy.
Abscess of the vermiform appendix.
Infected dermoid and ovarian tumors.

This is purely a clinical classification; a more scientific division based bacteriologically on the infecting organism, is the following:

(1) The gonococcus, producing gonorrheal abscesses in the tubes or ovaries, with pelvic adhesions.

(2) The streptococcus, seen oftenest in puerperal infections and commonly invading the cellular tissues with the production of a brawny phlegmon.

(3) The staphylococcus and the colon bacillus, producing ab-

scesses in the puerperal period, or by a secondary invasion in gonorrhea and tuberculosis; as well as from an infected vermiform appendix.

(4) The tubercle bacillus, causing cheesy and nodular tubes, with more or less extensive dissemination into the pelvic peritoneum.

(5) The group of non-infectious inflammations, already referred to.

SYMPTOMS AND DIAGNOSIS.

It is a matter of the utmost importance that the general practitioner, who handles the gross materials of all the specialties in his daily practice and separates such as need further elaboration to send to the specialist, should recognize clearly all his cases of pelvic inflammatory disease. As a rule, I am sorry to say, this group of affections is not promptly recognized to-day, and in many instances a diagnosis is forced upon the reluctant practitioner simply by the lapse of time, and by the fact that the patient continues to suffer and is failing in health, in spite of a course of polypharmacy. In this way a sort of diagnosis is made perforce, which is not creditable to the medical man, and on account of the serious loss of time, is often injurious to the patient. It is in order to bring the practitioner into closer touch with these cases, and to lay before him simple and satisfactory methods of making a diagnosis, without entering into unnecessary refinements, that these lines are written.

Looking at the pelvic inflammatory cases symptomatically, there are, in general, two groups, the non-sensitive and the sensitive. One of these, the non-sensitive, is an extraordinary class, in which there may be even widespread adhesions, more or less involving all the pelvic organs, but the patient may have no particular discomforts of any kind, and may not have complained of any pelvic disease at all, until some irregularity of function, such as excessive monthly periods, or a growing mass at length forces her to seek advice. At present, we are not in a position to explain the lack of pain in these instances. The diagnosis cannot be made by symptoms, for there are few or none, but only by a bimanual examination in the course of a routine investigation, when the adherent masses in the pelvis will be discoverable.

The sensitive group are those suffering from pain, which in practically all cases is present at the menstrual periods and which in the more pronounced cases becomes continuous and almost unbearable.

The pain may be intermittent or continuous; at times it is excessive, at others but slight, or altogether absent. Practically, all acute cases are very painful from the start, and the suffering continues until the disease either disappears or subsides into a chronic state. The pain is usually localized in the pelvis, and, as a rule, the painful area can be covered by the palm of the hand laid upon the lower abdomen over the right or left ovarian regions. On the right side the pain is sometimes located near enough to the brim of the pelvis posteriorly to cause considerable doubt as to whether or not the vermiform appendix may be at the root of the trouble. When the pain becomes intense, it is apt to extend over the whole lower abdomen, into the iliac fossa, and down one of the legs, following the anterior crural and sciatic nerves, or into the lumbar region of the side affected, in other words, the lower abdomen and legs are involved.

The pain due to a *bona fide* pelvic disease differs from the more or less ill-defined pains of a hysterical or a neurasthenic patient, in that the inflammatory pain has a definite habitat. The pain of inflammation is a fixed pain; it is never in one place to-day and then at some remote part of the body to-morrow, one day perhaps in the shoulder, and the next in the foot or the calf of the opposite leg, etc. It is a safe working hypothesis to conclude that a patient who complains of a definite pain, and who from day to day and week to week is definite in her complaint as to the character and site of the pain, has some gross trouble. This, I say, is a safe working hypothesis. It is not, however, safe to operate upon a patient upon such an indication; but, given such a definite complaint, I would give the patient an anesthetic, carefully examine the pelvic organs, and clear up the diagnosis in that way. As a rule, the pelvic inflammatory pain is gradually increased at the menstrual periods, becoming sharper with the congestion of the organs; in some cases it becomes intolerable at this time, but it is possible that the pain is not felt at all at the periods. In many instances, the pain is continuous, dull, aching, grinding, tearing in character, with exacerbations brought about by exercise, fatigue, etc. A sense of burning in the abdomen, often noted on the left side, over the pelvis or above it, is commonly associated with a neurosis without objective changes.

Fever is a variable factor; when there is no pus, there is, as a rule, no fever, or at most but slight elevations of temperature. When there is an acute infection or an exacerbation of an old infection associated with fever, there is an increase in the number of white blood cells in the blood (leucocytosis), from the normal seven to nine thousand up to fifteen to thirty or more thousand. This leucocytosis is greater in the puerperal than in the gonorrheal infections, and runs a course fairly paralleling the febrile curve. The absence of leucocytosis does not show the absence of an abscess in the pelvis.

When pus is present, and the process is not acute, there may also be no fever at all, or an elevation of only one half or one degree. With the extension of an infection from a focus of suppuration, however, the patient may run an acute febrile course for some days or weeks. Fever is found in all acute cases, varying in intensity with the character of the infection, and being most intense in the streptococcus puerperal patients.

In making a diagnosis of a pelvic inflammatory disease, close attention must be paid to the history, and often from this alone such strong presumptive evidence may be gathered, that a fairly accurate conjecture can be made.

In an acute case the cause, as a rule, is all too obvious; a young women comes to her physician with a free purulent vaginal discharge, the external parts may be more or less inflamed, and the cervix pouring out some secretions. After suffering from such symptoms for a few days or longer, she is seized with severe cramplike abdominal pains, with fever and great tenderness over the lower abdomen, so that she is obliged to go to bed. Or it may be that a young married woman comes with the same history; the doctor discreetly takes the husband aside and asks him if he had any gonorrheal disease at marriage, and he acknowledges an infection a few months back, but says his doctor discharged him cured, after a brief treatment. Again, the same history repeats itself after a menstrual period, when the portals for infection are thrown open through the increased congestion and succulence of the mucous membranes. The same sort of an infection is also prone to occur in the puerperal period.

The examination in acute cases reveals great tenderness at the vault of the vagina and the most delicate manipulation shows that this extends out laterally over the pelvic floor. In one and all of these cases there is an acute gonorrheal process at work. The history points to the diagnosis, and the microscopical examination of the secretions, showing intracellular diplococci in the pus cells, proves it beyond question. A gonorrheal infection may be inferred in cases of women of loose life, who are continually exposed to infection; or it may be suggested in married women by circumstances relative to the condition and habits of the husband, known only to the physician. In the unmarried, pelvic inflammatory disease is very apt to be due either to gonorrhea or tuberculosis. If the moral character is above suspicion, tuberculosis or corpus luteum cysts must be seriously considered. A gonorrheal infection may, as a rule, be proven from the character of the cervical discharge, and sometimes from the enlargement of the vulvo-vaginal glands; or from a lingering infection in the urethral glands, in which pus is easily squeezed out by a little pressure under the pubic arch; or it may be shown by the vaginal secretions, or from recrudescences of vaginitis, in which the gonococci become evident. Whenever it is possible, a little of the cervical secretion should be thinly smeared on a glass slide and examined under the microscope. If the general practitioner is not prepared to do this he can send the slide by mail to some one who is competent (see p. 258).

Puerperal cases often date from a bad labor with protracted use of forceps, followed by fever, and a slow getting up. These also are often gonorrheal in nature. If the examination of the discharge shows the absence of such a specific organism as the gonococcus, one of the staphylococci is probably at fault. The patient often comes with the definite statement that she has not been well since her last labor, or since a miscarriage.

Tuberculosis may often be suspected from the body habit, from the existence of tuberculosis elsewhere, from the family tendency; it may be associated with the uterine discharge and proven by curettage, and the finding of tuberculosis of an endometrium. Tuberculosis is apt to affect women in the first half of life who have not borne children.

When curettage is performed in pelvic inflammatory disease, the operator must be careful not to rupture any adhesions or to open an abscess by tractions on the uterus. If there are any lateral masses the uterus ought never to be pulled upon. If it is curetted, this should be done with the organ remaining *in situ* and with as little disturbance as possible.

Corpus luteum cysts have a tendency to rupture and pour blood into the cul-de-sac of Douglas, thus exciting an inflammatory reaction and leading to the formation of large adherent masses. An exactly similar process follows the rupture of extra-uterine pregnancy leading to the formation of the once much discussed hematocele.

Disease of the Vermiform Appendix.—The physician must always bear in mind that pelvic inflammatory disease is associated in not a few cases with disease of the appendix. This point is an important one, as the expectant plan of treatment is not suitable in cases where the appendix is concerned. This subject is more fully discussed in Chapter XXIV.

A further group of inflammatory affections, often bilateral, are associated with the small dermoid cysts, which may provoke a most violent inflammatory reaction. Dermoid cysts at every period of their growth are peculiarly liable to provoke a non-infectious irritative peritonitis with dense adhesions to the contiguous structures. These cases offer, perhaps, as good an example as could be found of a well-defined peritonitis in the absence of any micro-organisms. The invasion of the cyst by organisms is associated with febrile disturbances, increased pain, and the formation of pus.

Papillary cysts also form a peculiar group, almost always bilateral, in which the ovaries grow as large as the fist, and are filled with a mucilaginous material and papillary outgrowths which soon perforate the thin sac walls and spread on to the surrounding peritoneum. These cysts almost invariably provoke a violent inflammatory adhesive reaction. After taking a careful history and trying to get presumptive evidence of some one of these causes, the bimanual examination is made.

While a history of a fixed pain with exposure to infection, associated with or without vaginal discharge, may lead to a diagnosis of pelvic inflammatory disease, such a diagnosis can never be made with certainty until the disease is directly recognized by the examining finger. Upon introducing one or two fingers, the cervix may at once be noted to be immovable or relatively immovable. Carrying the finger a little farther up, a distinct swelling at the vaginal vault, posterior and lateral to the cervix, may make the diagnosis positive within a few seconds, even without any further investigation. Any swelling which is felt in this way by the vagina can also be more distinctly felt through the empty rectum as the finger enters the narrowed channel, back of the swelling, and is carried on above over its rounded, posterior eminences, which separate the finger from the uterus. If these distinct signs of inflammatory trouble are not readily found, it is well to suggest an examination under anesthesia. For the purpose of making a most complete anesthetic examination, it is often sufficient to give the patient nitrous oxide gas, but the addition of a little ether may be necessary in many instances to secure a complete relaxation. When the patient is under gas with the bowels well emptied, the cervix is caught by the tenaculum forceps and drawn carefully down, pulling the body of the uterus with it, while the finger is introduced into the rectum, and by invagination of the perineum, carried as high up in the pelvis as possible, to some point not far below the promontory of the sacrum. With the vaginal finger or fingers thus hooked around the uterus, tubes, and ovaries, and used as a sensitive, posterior plane ready to recognize any transmitted motion and any varying degrees of hardness in structure, the upper or abdominal hand is used to make pressure upon the various pelvic structures and bring them within the reach and touch of the fingers in the rectum. In this way, the uterine body is outlined, the posterior surfaces of the broad ligaments are palpated, the ovaries are clearly felt, and the examiner has the assurance that if there were any enlargement of the uterine tubes, they would be felt also. Where an abscess is suspected he must be careful not to drag the uterus far down, and not to use force in touching the lateral structure, for fear of rupturing it.

The simplest form of pelvic inflammatory disease which can be found is an adherent ovary. To find this the physician must so far have mastered the technic of the bimanual examination that he is able to recognize and handle a normal ovary per rectum. The posterior surface of the uterus and the fundus being large objects are easily found with a little practice; then, feeling gently out to the right or left of the cornu uteri just under the angle, the utero-ovarian ligament is first felt, and then, following this outwards, the ovary itself. It is hard, slightly irregular, or a little nodular, perhaps contains a large follicle, from two to three centimetres in diameter and always movable. If the ovary is adherent, it cannot be lifted from its bed, or else the little string-like adhesions are felt to snap as it is freed. Uterine tubes only lightly adherent, and not otherwise altered, cannot be felt.

It is most important to distinguish these pelvic inflammatory cases from cases of a sensitive pelvic peritoneum. It is not uncommon to see women who complain of extreme pain when any portion of the pelvic peritoneum is touched. For example, when a perfectly normal uterus is being palpated bimanually, they cry out with severe pain. This fact, namely, that the pain is complained of when normal structures are under touch, ought to put the examiner on his guard, so that he will attribute a like importance to the same complaints uttered when the structures lateral to the uterus, which cannot be so clearly outlined, are under examination. It will be seen from this that it is never safe to make a diagnosis from pain alone.

TREATMENT.

Prophylaxis.—There is but little use in uttering any warnings regarding the gonorrheal affections, as they are introduced under circumstances over which the temperate advice of the physician has practically no control.

This aspect of the question rests largely in the hands of those parents and educators who look at the formation of character and a chivalrous respect for woman as the chief factors in an education. Puerperal infection will be avoided by aseptic conduct of labor and the puerperium, as described in Chapter XIX. Over the tubercular affections, the corpus luteum cysts, and the neoplasms of the ovary, we can also exercise no control.

Forms of Treatment.—Treatment may be expectant, or palliative, or radical. In the acute forms there is rarely any call for active radical interference in the earliest stages. Where the highest skill is available, however, it is sometimes possible to cut short an acute attack, where, for example, there is a gonorrheal infection of the tubes, by opening the posterior cul-de-sac, and draining the peritoneum freely. This plan of treatment has been devised and successfully carried on by that able gynecologist, the late Dr. F. Henrotin of Chicago (*Trans. Amer. Gyn. Soc.*, 1895, vol. 20, p. 232). In the more acute conditions, and where there is no fever at all, rest is the sheet anchor in the treatment. The patient ought to be flat on her back in bed, and the bowels ought to be kept emptied. Prolonged hot saline douches may be given, making the temperature of the douche as near 120° F. as the patient can comfortably bear it. A tablespoonful of salt may be added to the quart of water, and the douche continued for from ten to twenty minutes. Patients who are suffering severely sometimes derive great relief from poultices on the abdomen. Where there is a painful swelling on the lower abdomen, an ice-bag over it with a towel intervening serves to restrain the inflammatory process and gives much comfort. In a more acute case, where there is manifest fluctuation, the vaginal vault should be opened. This is best done by bringing the patient to the edge of the bed or side of the table, with legs flexed on the abdomen; the cervix is then exposed by retracting the posterior vaginal wall, grasped, and held forwards, while the vault of the vagina, just behind the cervix, is opened with a pair of scissors from side to side. The peritoneum is soon visible just above the incised vagina (Fig. 95), and this is also carefully opened, at once effecting an entrance into the abscess, or else exposing its wall which is laid widely open. After all the pus is evacuated, the cavity may be thoroughly wiped out with a pledget of gauze, grasped in a pair of long forceps, after which it is loosely packed with an iodoform gauze drain. The opening into the vaginal vault tends to close rapidly. It may have to be enlarged once or twice in the course of the convalescence, however, before the abscess cavity has completely collapsed.

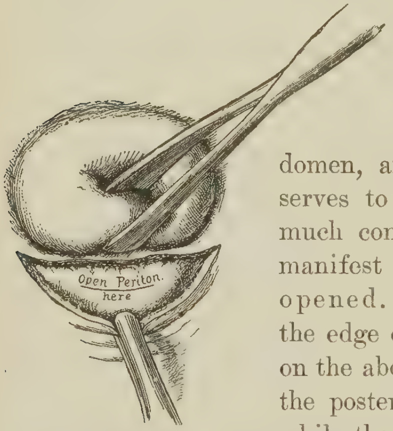


Fig. 95.—The Vaginal Vault is Exposed and the Cervix Caught by a Stout Forceps and Held a Little Forward while an Elliptical Incision is Made Posterior to the Cervix. Through this incision the peritoneum is opened and the abscess evacuated. (From Kelly-Noble "Gynecology and Abdominal Surgery," 1907, Vol. I.)

In a case which is clearly and beyond peradventure improving, the physician is warranted in waiting from week to week, keeping the patient under close observation. In a case which does not improve, or which grows worse, he should, after making a careful diagnosis, seek the advice of a specialist in abdominal surgery, either a gynecologist or a general surgeon, and consider the question of a more radical operation, either by the vagina or by the abdomen. It is not our province here to enter upon the technic of these radical operations.

The treatment in a chronic case is either operative or non-operative. All those cases should be operated upon in which there is a demonstrable abscess, or any large mass or masses, within the pelvis. It is important to do this, and to do it without delay, as the inflammatory cases with masses or tumors to the right and to the left in the pelvis are liable to exacerbations with rupture in the direction of the peritoneum, or into the bowel, or the bladder. Every case in which any lumpy or resistant areas are felt to the one side or the other should be looked upon as probably operative and referred to a specialist for an opinion.

The utmost that can be done for the non-operative cases is to wait awhile to see if Nature cannot relieve all the symptoms and cure the disease herself. Nature's great coadjutor in bringing this result about is Time. While waiting for the beneficial effects which are to accrue from time, the physician must exercise an intelligent supervision, watching the subsidence of the trouble from week to week, with gentle examinations from time to time, meanwhile prescribing such a regimen as will promote the end in view, while, at the same time, he restrains the patient from doing those things which will be likely to prove harmful. To these ends he enjoins much rest, late rising, and early bedtime, and rest for an hour after meals, forbidding active exercise and late hours. He must also see that the lower bowel never becomes clogged. Hot vaginal douches of plain hot water with table salt (two teaspoonfuls to a pint), once a day for say ten to fifteen minutes at a time, are often both refreshing and helpful. Some patients are helped by painting the vaginal vault with a strong tincture of iodine (Churchill's) about once a week, following this with a boroglycerid pack. This is done by nesting a teaspoonful of boroglycerid in a pledget of absorbent cotton, the size of the palm of the hand, tied with a string, folding this together, and placing it against the vaginal vault. The pack is removed in twelve hours by pulling on the string which hangs outside. I would repeat these packs about every third day. A douche must not be given while the pack is in the vagina.

Massage should not be given to the lower abdomen, although general massage is useful. Electricity, I believe, is of no service. When a case does not promptly improve, a specialist must be asked to see it; by neglecting to do this a malignant tumor may be encouraged to grow, or a case of pelvic inflammatory disease arising from the vermiform appendix may be overlooked and allowed to grow worse.

Many of the cases of pelvic inflammatory disease are due to tuberculosis which cannot get better until the disease is removed by surgery.

I wish especially to call the attention of the practitioner to the propriety of conservatism in many of these cases which come to operation. It is always comparatively easy to do a radical operation, that is to say, to take out both tubes and ovaries; but a more restricted removal of the diseased organs only, will conserve, at least, the function of ovulation and internal secretion, and it may be that of conception too, thus saving the patient much distress of mind and avoiding the disagreeable sequelæ of the extirpative treatment.

It sometimes happens that the physician, though he may not know as much as the specialist, is yet better able to safeguard the best interests of the patient, even on the operating table. This he can do in two ways, in the group of affections under consideration. In large abscesses he may cast his vote in the consultation in favor of pelvic drainage by the vaginal route. Paradoxical as it may seem, the worst cases sometimes get well in this way, with a good drain in the vault of the vagina, quicker than some of the apparently simpler cases which cannot be drained. At any rate, a patient with a big abscess can often be drained with perfect safety, when it would be most hazardous to attempt a complete extirpation. Later, if she needs it, the extirpation can be done with safety in the absence of pus.

Again, the attending physician may be called upon to decide for or against conservatism. To make an intelligent decision he must bear in mind the fact that in all cases of pelvic inflammatory diseases the ovaries are involved in adhesions simply because of the accident of their location close to the fimbriated extremities of the tubes, out of which the infectious materials are poured into the peritoneum. When the disease is of long standing, and the ovaries are withered through compression from the inflammatory exudate in which they lie embedded, it is of no use trying to save them. When the adhesions are not so bad, and the ovary, freed from its bed, appears comparatively healthy, it may be saved with the assurance that it will continue to carry on its functions perfectly, even though the tube has to be removed. Conservatism of the tubes in pelvic inflammatory disease is, as a rule, misdirected energy, but ovarian conservatism is well worth while.

If the patient is excessively anxious for offspring, the uterine tube may be amputated and its end left patulous. If then the ovary is not removed, at least a hope of conception is preserved, and this serves to ward off the distress of mind which would otherwise darken the life. If the whole ovary cannot be kept, a piece may be retained. If a good ovary is kept on one side and a good tube in the other, there is a fair hope of conception taking place.

When an ovary is the seat of a hematoma, and buried in a mass of adhesions, being itself converted into a mere shell, the uterine tube belonging to it, and the uterus when liberated from the adhesions, may prove entirely normal or else capable of perfect regeneration and restoration to normal functional activity.

When both ovaries form adherent hematomata, conservatism, as a rule, is not worth while.

In considering conservatism these facts must be borne in mind:

(1) It is useless to run risks of a continuance of the troubles from which the patient is suffering, for the sake of preserving the menstrual function, if she is forty years old or more.

(2) If the patient is single and middle-aged, without any expectation of marriage, the exercise of conservatism is less important.

(3) If the patient has to labor for her own living, it is best not to take too many chances of the return of the disease by leaving any crippled structures.

(4) It is dangerous to save tubes containing purulent or milky fluid. An old and apparently harmless salpingitis has been opened up, and the tube cleansed and dropped back into the pelvis, and this has resulted in the death of the patient.

(5) If the patient wants above all things to be well, then the physician will be less inclined to take chances with conservatism.

(6) As a rule, the results of conservatism are disappointing, and the patient ought always to be forewarned that it may be necessary to repeat the operation, and to make it more radical, if the first conservative effort proves a failure.

When and what to conserve in recent cases, and when and what not to conserve is a matter of fallible judgment; hence the common failures, even in the most experienced hands.

CHAPTER XV.

STERILITY.

Definition, p. 328. National importance, p. 329. Development of knowledge upon the subject, p. 332. Etiology in the male, p. 333. Etiology in the female, p. 339. Diagnosis and treatment, p. 351.

DEFINITION.

STERILITY is a disease of married life affecting the generative and procreative powers of the contracting parties, so that the marriage remains fruitless. If either husband or wife is incapable of procreation, the effect is the same as though both were affected.

Sterility is absolute when an individual has utter incapability, and relative when the difficulty is removable and there is a possibility of offspring, if only the partner is sound. Some women are sterile because their partners are incapable of procreation. Sterility is relative or facultative when brought about by voluntary sexual abstinence or by practices which prevent conception. That wedlock also is practically sterile in which, though conception frequently occurs, the product is cast off in an unnatural state by abortion or miscarriage.

It is of the utmost importance to distinguish between male and female sterility, and the most notable advance in our knowledge of the subject within the past generation has been due to a careful discrimination in this respect. For example, when a wife appeals to a physician for relief of sterility, he does not now commit the blunder of focussing his attention upon her alone, but insists upon a careful investigation of the procreative powers of the husband as well.

One-Child Sterility.—There is one special and important form of sterility, known as "one-child sterility," in which a woman conceives promptly after marriage, and then never does so again. Sometimes the reason is not discoverable, but the majority of such cases arise from puerperal infection; or a latent gonorrhea, recrudescent in the puerperal state; or a fresh gonorrhea acquired from the incontinent husband. Again, a fibroid tumor starts to grow and interferes with future conceptions. In rare cases there is an atrophy of the uterus with more or less amenorrhea. The causes, as a rule, are not difficult to elucidate after a careful history has been taken and a pelvic examination has been made.

Sterility is an affection which may be congenital or acquired, as, for example, in the male a congenital sterility may be associated with cryptorchism or epispadias, while an acquired sterility may be due to gonorrhea. In the wife the congenital form may be due to imperfect development of the internal genital organs, the acquired to pelvic inflammation. A woman is presumptively sterile who has not become pregnant within the first three years of married life.

NATIONAL IMPORTANCE.

The question of sterility is a problem of the highest national importance, for upon the fertility of the dual units (husband and wife) which go to make up the body politic depends the healthy national life. All wealth, all that is best in art and science, all precious stores of tradition may become worse than useless, a mere mockery of what might have been, if accompanied by a progressive sterility. Dr. Hunsberger has shown in an article on "Race Suicide" (*Jour. Amer. Med. Assoc.*, Aug. 10, 1907) that among families which can properly have children the population will not materially increase if there are fewer than four children to each pair. The intention of the Creator expressed to the first pair in the primal command coupled with the first blessing (Gen. i: 28) is rendered nugatory by sterility. Fertility is the natural outcome of right, clean living. Such a condition as a congenital, unavoidable sterility in either sex is rare; a vast amount of that decadence which constitutes a national problem is of the avoidable kind, and such sterility is almost without exception volitional; that is to say dependent upon illicit sexual relations.

In this way the percentage of sterility is an index to the morals of a nation. If the birth rate sinks below the death rate of a community, immorality and vice of all sorts prevail, and, looked at from this standpoint, it will at once be seen that the treatment of sterility, when the disease is marked enough to affect national statistics, is a deep and a difficult, if not a hopeless problem.

Drs. Newsholme and Stevenson (*Jour. of the Roy. Statistical Soc.*, Mar., 1906) have an interesting paper on this subject in which they point out as a source of declination, not increased poverty but the propagation of "the gospel of comfort," which is becoming the ethical standard for all civilized nations. Also the increasing practice of artificial prevention must mean a lower moral standard, because the increasing fertility in such poor countries as Ireland and Norway hardly accords with the attempt to explain sterility on economic grounds. Nor, they further remark, is the decline due to physical degeneration affecting the generative powers a cause of decrease in fecundity. The presumption is that the fall is due to conditions within the control of the people—a social form of *felo-de-se*. The following table, prepared by Dr. Jacques

Bertillon, is quoted as to the annual births per 1,000 women, aged fifteen to fifty, in four cities:

CLASSIFICATION.	Paris.	Berlin.	Vienna.	London.
Very poor quarters	104	157	200	197
Poor quarters	95	129	164	140
Comfortable quarters	72	114	155	107
Very comfortable quarters	65	96	153	107
Rich quarters	53	63	107	87
Very rich quarters	34	47	71	63
Average	80	102	153	109

The general conclusion arrived at is that as the decline seemed almost universal and " people did not change their morality in a large number of different countries at a given time without some extremely definite cause," a strong economic factor, that is, " the gospel of comfort," was in reality the determining one.

Among the most valuable works dealing with this question from a broad standpoint is one by Matthews Duncan (" Sterility in Women." J. A. Churchill, London, 1884). Duncan found that even among the better class sterility was increasing. Five hundred and forty absolutely sterile women consulted him within five years. These had been married between the ages of fifteen and forty-two, and three hundred and thirty-seven had been wives over three years. He has considerable confidence in stating one in ten as very nearly the true amount of sterility of marriages in Great Britain; for women delaying the commencement of fertility beyond sixteen months already exhibit a degree of relative sterility.

The annual summary of births, deaths, and causes of death in England and Wales, and in London and other large towns, for the year 1906 shows that the marriages in England and Wales during the year 1906 numbered 269,734, corresponding to a rate of 15.6 persons married per 1,000 of the population at all ages. This rate was 0.3 per 1,000 above the corresponding rate in 1905, but was 0.2 per 1,000 below the average rate in the ten years between 1896–1905. The births registered in 1906 numbered 934,391, and were in proportion of 27.0 per 1,000 of the population at all ages; this rate was 0.2 per 1,000 below the rate in 1905, and lower than the rate in any other year in record; compared with the average in the ten years 1896–1905 the birth rate in 1906 showed a decrease of 1.7 per 1,000. The deaths registered in 1906 numbered 530,715, and were in the proportion of 15.4 per 1,000 of the population; this rate was 0.2 per 1,000 above the rate in 1905. Compared with the average in the ten years 1896–1905 the death rate in 1906 showed a decrease of 1.4 per 1,000. (London *Times*, June, 1907.)

The table below shows the calculated amounts of sterility at different periods of married life in women married at different ages, the table being calculated for twenty months.

SHOWING THE RELATIVE STERILITY OF A MASS OF WIVES MARRIED AT DIFFERENT AGES AT SUCCEEDING EPOCHS IN MARRIED LIFE.

AGE OF MOTHER AT MARRIAGE.	15–19.	20–24.	25–29.	30–34.	35–39.	Total.
Proportion sterile about the 5th year of married life is about 1 in..........	2.78	2.61	1.68	1.51	1.19	2.09
Or a percentage of..................	35.9	38.3	59.4	66.0	84.1	47.9
Proportion sterile about the 10th year of married life is about 1 in........	2.09	1.71	1.39	1.24	....	1.61
Or a percentage of..................	47.9	58.3	71.8	80.8	....	62.1
Proportion sterile about the 15th year of married life is about 1 in........	1.57	1.32	1.10	1.05	....	1.26
Or a percentage of..................	63.8	75.5	90.9	95.5	....	79.2
Proportion sterile about the 20th year of married life is about 1 in........	1.24	1.13	1.01	....	....	1.11
Or a percentage of..................	80.4	88.6	98.7	....	....	89.8
Proportion sterile about the 25th year of married life is about 1 in........	1.02	1.00	....	....	....	1.01
Or a percentage of..................	97.6	99.65	....	....	....	99.03

SHOWING THE VARIATIONS OF STERILITY ACCORDING TO THE AGES OF THE WIVES.

AGES OF WIVES AT MARRIAGE.	15–19.	20–24.	25 29.	30-34.	35-39.	40-44.	45-49.	50, etc.	Total.
Number of wives...	700	1,835	1,120	402	205	110	46	29	4,447
First children......	649	1,905	809	251	96	10	2	....	3,722
Sterile wives.......	51	....	311	151	109	100	44	29	725
Percentage sterile..	7.3	....	27.7	37.5	53.2	90.9	95.6	100	16.3
Proportion sterile, 1 in..............	13.72	....	3.60	2.66	1.88	1.10	1.05	100	6.13

The main element, says Duncan, in expectation of sterility is the age at marriage, but statistics suggest other laws, namely, that the question of a woman's being probably sterile is decided in three years of married life, only seven per cent bearing after this period.

Another law is that when the expectation of fertility is greatest the question of probable sterility is soonest decided and *vice versa*, for it has been noted that of wives married from twenty to twenty-four who are all fertile, only six and two-tenths per cent began to bear after three years of marriage.

Also, in writing of age, he says that "although it seems absurd to rank marriage among the causes of sterility, yet the conclusion that it is so, at least in the very young, appears to be inevitable."

SHOWING THE INITIAL FECUNDITY OF WOMEN UNDER TWENTY YEARS OF AGE WITHIN THE FIRST TWO YEARS OF MARRIAGE.

AGES OF WIVES NEWLY MARRIED.	16.	17.	18.	19.
Number of wives newly married....................	43	108	225	314
Number of wives mothers within two years of marriage	4	27	98	177
Proportion of latter to former is 1 in..............	10.7	4.0	2.3	1.8
Proportion after correction for immaturity is 1 in....	7.7	3.3	2.1	1.7
Or percentage...............................	12.90	30.00	46.44	57.84

So that the Legislature, by raising or depressing the majority age, might exercise control over the population. In England about nine thousand young persons of the age of twenty and under twenty-one marry annually, and one hundred and thirty-nine thousand at twenty-one to twenty-five.

Another test of sterility given by this author is: How soon after marriage does a woman bear her first child? Some statisticians give eleven and a half months, but Ansell, quoted by Duncan as the most accurate authority, gives data of six thousand and thirty-five cases, showing a mean interval of sixteen months.

Showing the Interval Between Marriage and the Birth of First Children.

Year after Marriage.	Number of First Children.	Year after Marriage.	Number of First Children.
1	3,159	8	11
2	2,163	9	7
3	421	10	7
4	137	11	5
5	69	12	4
6	26	13	3
7	21	14	2
Total			6,035

And the annexed table also shows there is no good presumption of sterility till the fourth year of married life is entered on.

DEVELOPMENT OF KNOWLEDGE.

The history of the recognition and treatment of sterility is fraught with interest no whit behind that of many other branches of medicine and surgery which have undergone such remarkable evolution within the past two or three decades.

Until recently the conception which prevailed was that there was but one form—that which was evidently commonest in Biblical days, when we read in the inspired record of the sterile women that "The Lord had closed up all wombs" (Gen. xx. 18), and of the relief of such condition, "God opened her womb" (Gen. xxx. 22). With the increasing "civilization" of the world a number of new causes have become operative which were overlooked until recent times. Even so short a time ago as the days of Marion Sims, closure of the womb was practically the only condition recognized and all cases were subjected to the same treatment—dilatation. At this period—the sixties and seventies of the last century—the wife was always treated, the treatment being always one and the same thing.

Noeggerath ("Die latente Gonorrhœa im weiblichen Geschlecht." Bonn, 1872), neglected and ridiculed like most pioneers who essay to overthrow settled convictions, was the apostle of the new doctrine which rightly threw the responsibility for the common sterility upon the uncured and often incurable gonorrheas transferred from the courtesan to the wife, from the bawdy house to the marriage bed. Slowly, very slowly, aided by the powerful pen of Max Sänger of Germany (*Verhand. d. Deutsch Gesell. f. Gyn. u. Geb.* München, 1886) did the views of Noeggerath become the conviction of the medical profession at large.

Following the discovery of this writer, wrought out of his remarkable insight and analysis of his chemical findings, the extraordinary discovery of the gonococcus by Neisser placed the question of the diagnosis of catarrhal and gleety discharges in both sexes beyond a peradventure and hastened the reception of Neisser's discovery by putting incontestable evidence into the hands of the profession. Had it not been for the work of Neisser, Bumm, Wertheim, and others, I suppose this important question would still be under discussion and the wife still receiving, as she readily accepts, all the blame for the often distressing situation.

We note in the history of this interesting subject the following illuminating facts:

(1) The age-long recognition of the fact that sterility may be due to closure of the neck of the womb.

(2) The discovery of the importance of gonorrhea, especially in its latent forms, and particularly in the male.

(3) The discovery of the gonococcus giving scientific precision and certainty to the views of Noeggerath.

(4) Greater skill in examining the internal genitalia in woman revealing tubal, ovarian, and pelvic inflammatory diseases often responsible for sterility and hitherto unsuspected.

It would be gratifying to add that *pari passu* with the discovery of these new causes have gone the therapeutics of the condition. Unfortunately, as is too often the case, therapy lingers with laggard feet outside the doors of etiology.

Although it is here my professed aim to deal with medical gynecology alone, I cannot discuss this important subject without giving at least brief consideration to the question of male sterility.

It is crudely supposed and is everywhere accepted by the laity that ability to complete the sexual act is of itself sufficient proof that the husband is capable of begetting offspring and the responsibility for sterility does not rest on his shoulders, that is to say in more delicate and technical terms that *potentia coeundi* is equivalent to *potentia generandi*!

ETIOLOGY IN THE MALE.

There are two kinds of incapacity for procreation on the part of the male which entail sterility in the wife.

(*a*) Inability to enter upon or complete the sexual relation.

(*b*) Where the relation is apparently in every respect normal, the seminal fluid is partly or wholly devitalized, containing few or no living well-developed spermatozoa.

Sterility of the first kind in the male may arise from marked congenital deformities such as epispadias and hypospadias, exstrophy and cryptorchism.

It may also be due to extreme self-abuse in youth and the exhaustion of the sexual powers by early excessive venery. I have seen one instance of a man postponing marriage until the sixties and then selecting a beautiful young wife rather that she might preside over his house than for love he bore her: he had no sex desire and, held in check by his indifferent wife, was unable to consummate the marriage relation.

All the conditions of male sterility belonging to this category are at once manifest, being allied to an impotence which is almost invariably a source of acute distress and shame to the victim, who for this reason rarely ventures to enter on the married state.

Such conditions are not affected by treatment, least of all by any of the wretched quack devices by which the victims are deluded from year to year to the depletion of their purses, but without quenching the spark of hope which renders them susceptible to the next lying advertisement of the lowest parasites prostituting the name of doctor. I would single out particularly the disgusting exhaustion apparatus employed to delude the poor victim by inducing a transient semblance of vitality. Under such circumstances the thoughts of the patient are best diverted into happier channels, and if unmarried, let the assurance be given that life holds within its compass a promise of nobler things than that of permitting the brain to revolve around the genital organs as the centre of interest.

The second group comprises males affected with gonorrhea, the destructive effects of which are seen in the epididymis, the vas deferens, the seminal vesicles, and the prostate gland. If through this cause both testicles are rendered functionless, or both vasa deferentia closed by an epididymitis or a deferinitis the result will be an azoöspermia or a fluid in which there will be no living spermatozoa. A chronic vesiculitis or a chronic prostatitis will develop an oligospermia in which the living elements are few and far between or in which they are altogether absent, though dead ones or only those with feeble motile powers may be found—necrospermia.

These affections render the male incapable of generating offspring (*impotentia generandi*), though capable of an apparently normal sexual relation (*potentia coeundi*).

A vesiculitis can be discovered by a rectal examination which reveals tenderness and fibrous thickening about the seminal vesicles. Pressure on these organs—"milking" them—will often induce a discharge into the urethra which can be examined at once. In the same way the prostatic secretion can be secured and examined. Casper (*Monatsb. f. Urolog.*, 1900, vol. 5, p. 385) found prostatitis in eighty-five per cent of cases of chronic urethritis; that is, in a group in which the disease had persisted over two months.

Out of two hundred and forty-two cases of double epididymitis collected by Finger, this eminent authority found two hundred and seven cases of azoöspermia, while Kehrer ("Beiträge zur klinischen und experimentellen Geburtskunde und Gynäkologie," 1892, p. 76) found an azoöspermia in thirty and twenty-one hundredths per cent of ninety-six sterile marriages.

Sänger, in analyzing 110 such marriages, found:

in 53.6 p. c. normal sperm,
" 11.8 " oligospermia,
" 33.6 " azoöspermia.

These data are sufficient to show the extreme importance of investigating the male in every case of sterility, and the determination of male sterility is easy if the microscope is used. It should be borne in mind that it is not enough to rely upon the general assurance of the man, and least of all upon that of the wife, that he "is all right."

The sperm is best secured for examination after a *coitus condomatus*, or by the act of withdrawal and the discharge of some of the semen into a small bottle which is corked and at once dropped into a bottle of warm water jacketed with flannel, which should be kept warm, not hot, until examined microscopically. In view of such examinations the husband should remain continent for four or five days, and will do best to break his abstinence in the early morning.

The physician must never forget that even though repeated examinations show azoöspermia, at a later date a few living cells may be found and conception be possible. Such are some of the cases in which pregnancy occurs after years of sterile married life.

When, as the result of his analysis of the two factors involved in every case of sterility, the physician finds that the trouble lies at the husband's door it is his duty either to say nothing or to lay the blame where it belongs. But in no instance should the wife be allowed to suffer continual mental disquietude or be subjected to unnecessary treatments for an ailment which is not primarily hers. The fellow feeling which sometimes induces the physician to gloss over the husband's defect and lay an unmerited burden of worry and sorrow on the shoulders of the innocent wife is not creditable to our profession.

The hope of procreation is apparently forbidden by the conditions of azoöspermia, but the cautious physician will always carefully avoid, for two reasons, giving a hopeless prognosis. First, the event may disappoint his expectations by the temporary nature of the condition in some cases. Every man with a large experience can recall cases where conception has occurred after ten, twelve, or even more years of sterility. Second, the effect on the man thus condemned may make him morbid or melancholic.

In regard to the proportion of cases in which the husband is responsible for the sterility, I give some statistics taken from the excellent work of F. Schenk ("Die Pathologie und Therapie der Unfruchtbarkeit des Weibes," p. 90 *et seq.*).

"Lier and Ascher, who examined the statistics of primary sterility, that is to say of women who had never conceived, found in 227 cases in Prochownik's clinic, that 76 sought advice on account of sterility, 151 on account of various gynecological affections. The husbands of these women were examined in 132 cases, and it was found that 42, or 31.8 per cent, had no living sperm cell (azoöspermia), while 11, or 8.3 per cent, were impotent; 41 of the men had infected their wives with gonorrhea, and only 38, 28.8 per cent, were healthy. According to these figures the fault lay on the side of the man in 71.2 per cent of the cases. In 39 cases where the husband was examined, or 29.5 per cent, there was a definite obstacle to conception on the part of the woman. There were 50 men who refused examination, and 27 of these had infected their wives with gonorrhea; 45 men could not be examined, for various reasons, and in this group 13 wives were found to have gonorrhea. . . .

"In 197 cases of acquired sterility examined by Lier and Ascher, the causes of it were found to be distributed as follows:

Coitus reservatus	48	cases
Azoöspermia	2	"
Gonorrheal infection	35	"
Puerperal infection	27	"
Various genital affections	85	"

"In this group, leaving out of consideration cases of facultative (voluntary) sterility, the fault lay with the man in 18.8 per cent of the whole. . . .

"Sänger investigated material covering the period between 1891 and 1899, and found 397 cases of primary sterility and 21 cases of secondary sterility.

"I. Of these 397 sterile marriages both man and wife were examined in 110 cases. The examination of the semen showed normal sperm cells in 59 cases. In 13 cases there was deficiency of semen (oligospermia), in 37 there was azoöspermia, and in 1 case *impotentia coeundi*. Taking these statistics just as they stand we find a percentage of 46.4 in which the sterility was on the male side. Of the 59 men with normal sperm cells, there were 28 who had certainly had gonorrhea, and of this number the wives were infected in 14 cases, making the total proportion of male sterility in these 110 cases 65, or 59.1 per cent. Only 45 marriages could be found in which no blame could be attached to the husband. . . .

"If these 110 cases are analyzed and the proportion of causes of sterility stated in percentages, the results are as follows:

"(*a*) Direct sterility due to the man by reason of impotence, azoöspermia, or oligospermia, 51 cases	46.4	per cent
Indirect sterility due to the man through the transmission of gonorrhea to his wife, 14 cases	12.7	"
Total of male sterility	59.1	per cent

“ (*b*) Sterility in the woman caused by

Endometritis fungosa	6	cases	
Parametritis post. atr.	5	“	
Stenosis of cervical canal and ext. os	16	“	—14.5
Anomalies of development	3	“	
Stenosis with endometritis	7	“	
Retroversion and retroflexion	4	“	
Ovarian cyst	1	case	
Loss of semen	1	“	
No pathological finding	2	cases	
Total of 45 cases	40.9	per cent	

“ These statistics approach closely to those of Lier and Ascher, which made the percentage of cases, in which both parties were examined and the fault lay with the husband, 71.2 per cent. Lier and Ascher found direct sterility caused by azoöspermia and impotence in 40.1, and indirect sterility, through transmission of gonorrheal infection, in 31.1 per cent of their cases.

“ II. In 287 cases of primary sterility the woman only was examined, with the following results:

“ (*a*) Gonorrheal infection was found in 107 cases, or 34.8 per cent. In 28 of these cases, or 9.7 per cent, fresh gonorrheal infection was present, in the form of urethritis, Bartholinitis, endometritis, etc. In 79 women, or 27.5 per cent, there were inflammatory changes of the adnexa such as pyosalpinx, salpingo-oöphoritis, and chronic peri-salpingo-oöphoritis.

“ (*b*) Besides these 107 cases in which the woman had gonorrhea with resulting sterility for which the husband was responsible, there were 33 men with gonorrhea whose wives showed no evidence of it. Of this number 16 had gonorrhea without involvement of the testicle; 11 had single epididymitis with the gonorrhea; and in 6 there was a double epididymitis. As the semen of these men was not examined, it cannot be said with certainty whether the sterility was due to gonorrhea in them or to non-gonorrheal disease in the wife. The various affections found to exist in these 33 women were as follows:

“ Infantile uterus	2	cases
Stenosis (uterus parvus)	6	“
Escape of semen	2	“
Fungous endometritis	8	“
Simple endometritis (with stenosis)	5	“
Retroposition of uterus (with stenosis)	4	“
Chronic atrophic parametritis	2	“
Myomata of uterus	1	case
Adipositas	1	“
Anemia	1	“

“ (*c*) Of the remaining 147 cases in which the woman only was examined no gonorrheal infection was found, while there was no record of gonorrhea in the man, either through examination of the semen or admission on his own part. In the absence of any examination of the semen, it is not justifiable to charge the sterility to the wife, even though she is found to have a definite gynecological affection. The genital affections in these cases are as follows:

“ *Inflammations of non-gonorrheal origin.*

Tuberculosis of the adnexa	1 case
Fungous endometritis	13 cases
Parametritis, atroph. post	4 “
	18 cases

“ *Displacements.*

Retroflexion and retroversion of uterus	6 cases
“ “ “ “ “ with metritis	1 case
“ “ “ “ “ “ stenosis of external os	9 cases
	16 cases

“ *Anomalies of development.*

Complete stenosis of the cervical canal and of the external orifice of the uterus, due to anteflexion of a small uterus	28 cases
Anteflexion uteri parvi (without stenosis)	4 “
Stenosis with fungous portio	1 case
Atresia and stenosis of the hymen	4 cases
Fetal uterus	1 case
Infantile uterus	7 cases
Hypoplasia of the uterus	1 case
Atrophy of uterus (climax precox)	1 “
	47 cases

“ In addition to these:

Stenosis of cervix and of external os with endometritis	26 cases
“ “ “ “ “ “ “ “ parametritis	3 “
	29 cases

“ *Neoplasms.*

Polyp of cervix	1 case
Carcinoma of cervix	2 cases
Ovarian cystoma	4 “
Myomata of uterus	9 “
	16 cases

“ *Constitutional causes.*

Anemia (chlorosis)	6 cases
Adipositas	6 “
Tuberculosis of lung	2 “
	14 cases

"In the remaining cases where the pelvic organs were normal there was vaginismus in 2 cases; intact hymen in 1 case; loss of semen in 1 case; while in three cases which sought advice on account of sterility no hindrance to conception whatever could be found.

"III. In the investigation of secondary sterility there were 21 cases in which the woman only was examined, and in these the causes of sterility were as follows:

Gonorrhea with disease of adnexa	6 cases
" without disease of adnexa (endometritis)	3 "
	9 cases

"*Puerperal diseases.*

Pelvic peritonitis	1 case
Fungous endometritis with parametritis	2 cases
Parametritis with disease of the adnexa	1 case
" (uncomplicated)	1 "
	5 cases

"The percentage of puerperal diseases in the causation of secondary sterility is 24 per cent, while that of gonorrhea is 43 per cent."

ETIOLOGY IN THE FEMALE.

Anatomical and Physiological Causes.—Bearing in mind that certain deviations from the normal sometimes cause sterility, it becomes important to consider first the anatomy and physiology of the female genital organs.

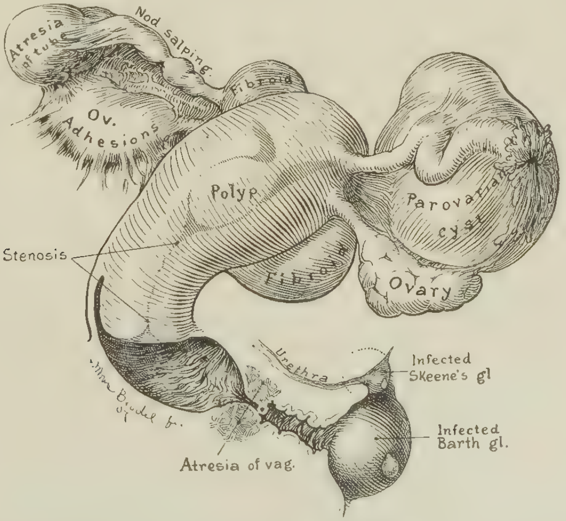


FIG. 96.—SOME OF THE CAUSES OF STERILITY BROUGHT TOGETHER IN ONE DIAGRAM. These are: An infection of Skene's or of Bartholin's gland significant of gonorrhea; atresia of the vagina; stenosis of the cervix; a polyp hanging into the uterine cavity; fibroid tumors; a fibroid at the attachment of the uterine tube; a parovarian cyst splinting the tube and separating it from the ovary; a nodular salpingitis due to gonorrheal or tubercular inflammation; an atresia of the tube, of inflammatory origin; ovarian and tubal adhesions.

The various conditions likely to be found associated with sterility, when any demonstrable lesion exists, are shown for the sake of clearness and appeal to the eye in Figure 96. These may be traced categorically, step by step, from the vaginal orifice upwards:

A gonorrheal infection of Skene's glands.
An infection of Bartholin's (vulvo-vaginal) gland.
A stricture of the vagina.
A narrow cervix.
A uterine polyp.
A uterine fibroid tumor, either in the wall or blocking a tube.
A parovarian cyst.
A nodular salpingitis, from gonorrhea or tuberculosis.
An atresia of the uterine tube from inflammation.
Ovarian adhesions.

The vulva is significant only in so far as a small mons with small labia and a slight capillary development such as one sees in children approaching their teens, should at once put the physician on his guard, as this condition may indicate a similar want of development of internal organs.

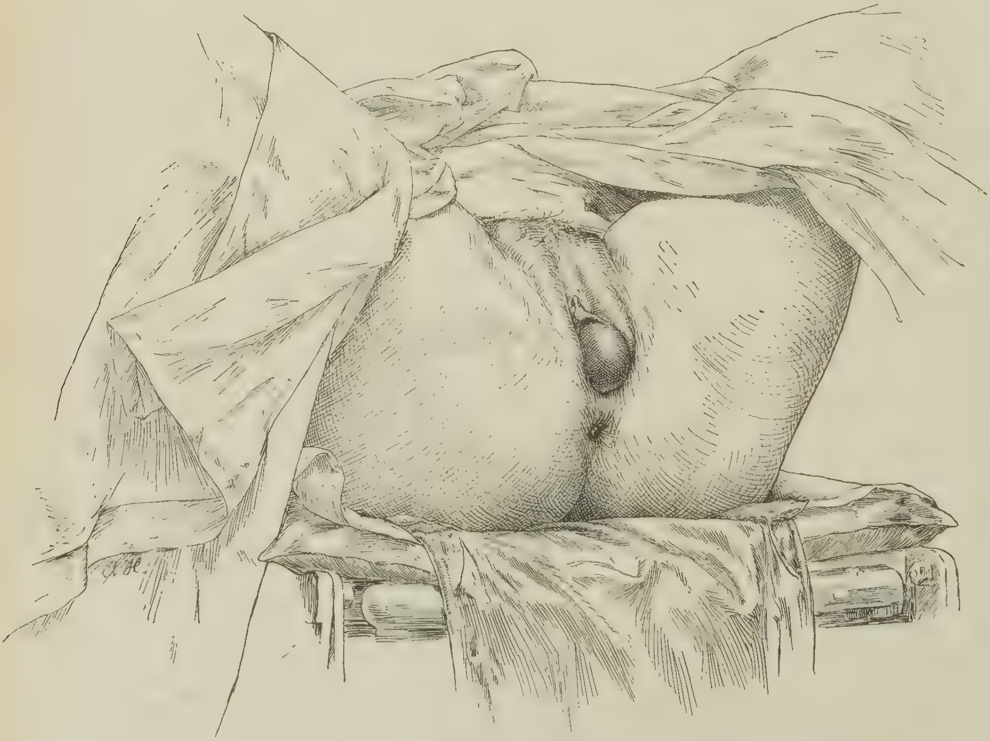


FIG. 97.—CYST OF THE LEFT BARTHOLIN'S GLAND, OFTEN AN INDICATION OF A GONORRHEAL INFECTION AND THE CAUSE OF STERILITY.

Three things must be carefully noted in examination of the vulva in its deeper portion where the vulvo-vaginal (Bartholin's) glands lie buried close to the entrance into the vagina and posteriorly. Each of these notable marks suggests the existence of a chronic gonorrheal affection.

(1) The gland itself may feel like a little dense sclerotic mass the size of a small bean (see Fig. 97), the residuum of an old gonorrheal affection called by Sänger *adenitis glandulæ Bartholinæ scleroticans.*

(2) The duct of the gland may feel like a little dense cord.

(3) The outlet of the gland where it discharges above at the vulvo-vaginal orifice near the hymen may appear intensely red; it is often likened to a flea-bite, and has been called the *macula gonorrhœica.* Caution, however, must be used in drawing an inference from the macula alone. It is, in my experience, not a safe guide. If the gland or its duct is diseased, careful squeezing may cause a little pus to exude which should be transferred to a cover slip and examined microscopically.

The Hymen.—A rigid or unruptured hymen shows that coitus has never been completed, if attempted. The signs of a defloration, whether accomplished digitally, instrumentally, or sexually, are always evident in the hymen. The most important sign is to be noted in its elasticity, which easily admits one or two fingers into the vagina without distress. If the well-oiled finger can be readily introduced into the vagina without eliciting a cry, a conclusion may be drawn that some penetrating body has entered the same channel. A single digital examination is thus sufficient to destroy the signs of virginity. Too often the occasion for such unnecessary rupture lies in the examination of a young girl who simply begins to complain of a dysmenorrhea. Repeated unskilled examinations and treatments of young persons effect nothing for their cure and constitute a crime closely allied to rape. More than two centuries ago Severinus Pinæus uttered the sound dictum, "*Magnum est crimen perrumpere virginis hymen.*" Let it be inscribed over the door of every consulting room.

On or about the hymen one often finds tender red spots, carefully described by Sänger; these are frequently the outcome of a chronic gonorrhea.

The Urethra.—The urethra may appear swollen and red, bleeding to the touch and constituting a source of much distress, causing the patient to shrink from examination. This, too, is often due to gonorrhea.

Skene's Glands.—Often the seat of a chronic gonorrheal infection is found in Skene's glands (glandulæ paraurethrales) manifested by a puffiness and eversion of the lips of the urethra, exposing one or both of the glandular orifices which normally lie concealed just within the external meatus. On squeezing the glands by pressing up under the urethra and milking them outwards with the finger tip a drop of pus may be forced out of one or both sides. If Skene's glands are empty, then it is well to dry the urethral orifice and to stroke the entire urethra downwards from the neck of the bladder to the meatus externus, taking up any discharge thus brought to light for further examination. A gonorrheal infection thus discovered will be evidence of a chronic urethritis.

It should be borne in mind that a careful distinction must be made between a milky discharge often seen and due to an accumulation of epithelial débris within the glands and a purulent discharge. The microscope only is competent to decide.

In its chronic form a urethritis occasionally (in women rarely) results in a stricture of the urethra. This is readily found by attempting to pass an ordinary urethral catheter. A large experience justifies the statement that I have hardly seen more than six cases of strictural urethra in women.

The Vagina.—Two deformities in the vagina call for notice: first a double or septate vagina in which the canal is divided up to the cervix which presents two openings (ora), one in each half. This is a condition of arrested development in which the uterus may also be septate or two-horned, or in which while one-half of the uterus is developed the opposite half may remain rudimentary. Startling as this condition appears at first sight it does not cause infertility; the real danger lies in the possibility of a conception taking place in the rudimentary side followed by early rupture, or in late rupture of the more developed side.

Second, there may be stricture of the vagina, either congenital or acquired. In both cases the vagina ends in a *cul-de-sac*, but in the congenital form the uterus above is undeveloped; in the acquired the uterus is not affected. It must be borne in mind that many of the cases formerly labelled congenital atresia were in reality atresias due to sloughing of the vagina occurring in the course of a scarlatina, a severe typhoid fever, or some other infectious disease in childhood.

An atresia may follow the sloughing incident to a difficult labor inducing a one-child sterility. An atresia well within the introitus may not be discovered until the medical examination is made, as the shortened vagina may lengthen from intercourse.

A reddened, inflamed, patchy, or granular vagina, with a milky secretion (colpitis maculosa or granulosa), is often evidence of an old gonorrhea. The excessive acidity of the vaginal secretion, which frequently excoriates the vulva and the adjacent skin, may also serve to destroy the spermatozoa. The reaction of the vaginal secretion must always be tested with blue litmus paper.

Another cause of sterility is shortness of the vagina, or, in the acquired form, a broken-down vaginal outlet which refuses to retain the spermatozoa. Patients often complain of the latter condition, namely, the escape of the seminal fluid, which is, to them, a seemingly self-evident cause of their condition, but it is doubtful how far it is really instrumental in it. I am not, myself, disposed to assign any great importance to it in the causation of sterility.

Affections of the Neck of the Uterus.—Between the vagina and the cervix there is a great change in anatomical conditions. The vault or *laquear vaginæ*, where an abundance of semen is deposited, is exchanged for a narrow cervical canal, entered by a constricted orifice and leading up into a flat channel, also rigid, out through the uterine tubes and through the star-shaped channel of the isthmial portion of the tubes into the labyrinth of folds in the tubal ampullæ where the spermatozoa normally meet the ovum. Considering the complexity of the arrangement, the wonder is that the conjunction between the sperm cell and the ovum is ever effected. The progress of the spermatozoa may be hindered by various abnormal conditions, which are here considered in order.

Elongation of the Cervix (col tapiroides).—An elongate cervix lying in the axis of the vagina and projecting down toward the outlet may present an obstacle to the passage of the semen. This condition is, as a rule, associated with a sharp anteflexion of the uterine body, and its importance lies, not so much, perhaps, in the length of the cervix or in the flexion, as in the maldevelopment to which both conditions are due.

Smallness of the Cervical Orifice.—A diminutive opening of the cervix into the vagina is the only cause of sterility commonly recognized by the laity as well as by the general practitioner. When the orifice is minute (pin-hole size) and no other probable cause can be found on careful examination, the condition is worth consideration as likely to be an efficient barrier to the entrance of the spermatozoa.

Diseases of the Uterus.—Erosion of the cervix is characterized by an enlarged and puffy condition of the os, which lies in the centre of a reddened area presenting a granulated appearance. Such a condition may be due to hyperemia and swelling of the mucosa of the cervix, which having no other situation in which it can expand, rolls out at the cervical os and so becomes apparent at the vagina. In other cases the erosion is clearly a physiological extension of the cervical mucosa into the vaginal portion of the cervix. This is the innocent affection so often and so persistently treated under the name of "ulcers of the womb," a condition which, in reality, almost never exists.

Infections of the Cervix, Gonorrheal and Otherwise, Including Endocervicitis and Cervicitis.—A simple erosion of the cervix must not be mistaken for a gonorrheal infection of the cervical glands, which in some respects it resembles. A gonorrheal cervicitis or endocervicitis is characterized in the first place by a tenacious mucoid or muco-purulent discharge. This ropy discharge, so often seen in women, comes invariably from one source, and that is the glands opening onto the cervical canal. There is often a marked congestion and puffiness of the cervix, which bleeds easily on touch, and is inclined to bleed copiously when caught with tenaculum forceps. Sometimes there is a marked eversion of the cervical mucosa which allows the secretion to be seen issuing from the glandular orifice. This form of infection is deep-seated and obstinate in character, persisting for years, and sometimes until the natural atrophy of the parts brings relief. The cervical glands are *par excellence* the seat of a chronic gonorrhea.

Laceration of the Cervix.—Cervical laceration is sometimes a cause of one-child sterility; but a word of caution is necessary here against overestimating the importance of the condition from this point of view. Laceration of the cervix has been the bug-bear of the medical profession for about a generation, and it is now time it was laid in its grave. A simple laceration, by which the cervical os is converted into a slit, or else the cervix forms two distinct lips, more or less deeply notched on either side, must be regarded as physiological, and calls for no surgical interference whatever. How many women in whom this condition existed have been the victims of the meddlesome surgery of the past! Even a deep laceration, converting the cervix into two well-defined flaps, has no bad effect upon the general health, though I am not prepared to deny that it may not act as a factor in the production of sterility. The serious cervical lacerations are those in which there is an infection of the cervical glands with hyperemia, infiltration, and eversion, superadded to the laceration. Such cases of infected cervices undoubtedly operate to maintain sterility, both by the infiltration which they induce and by the tough secretion arising from them which plugs the cervical canal.

Cancer of the Cervix.—Cervical carcinoma is a disease usually associated with an acquired sterility. The patient who has a cancer of the cervix has usually borne children, but ceases to conceive when the cancer appears. The affection has no practical bearing on the subject in hand further than exists in the fact that the sterile woman is comparatively immune from this dreadful malady.

Cervical Polyp.—A polyp of the cervix also may prevent conception. These little, soft, mucoid tumors are usually rose-colored or dark red and hang pendent in the cervical canal, appearing like a plug in the external os.

Endometritis.—A gonorrheal endometritis, except in the acute form or during the puerperal period, is extremely rare. All conditions associated with menorrhagia and collated under the head of endometritis are factors in

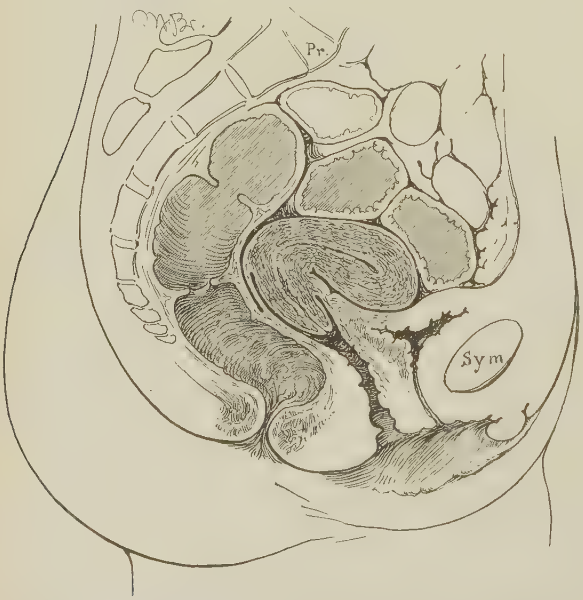


Fig. 98.—Acute Anteflexion of the Uterus with Conical Cervix tending to become Tapiroid. A sign of abnormal development. Pregnancy is not apt to occur in these cases.

the causation of sterility. I believe, however, that more cases of sterility are caused by intra-uterine medicative treatments than are cured by them.

Displacements of the Uterus.—Extreme anteflexion (see Fig. 98) can hardly be regarded as a cause of sterility, which lies rather in the undeveloped state of the uterus from which the anteflexion itself arises than in the position of the organ. The strong forward flexure of the uterus must not be confused with the moderate forward inclination present in every sound woman. Retroflexion of the uterus (see Fig. 99) may prevent conception, but it does so most frequently in the case of women who, having borne one child, acquire a marked retroflexion with a *descensus*. In the case of a nullipara it is wise to be extremely guarded as to the prognosis of cure of a sterility through measures adapted to relieve the retroflexion.

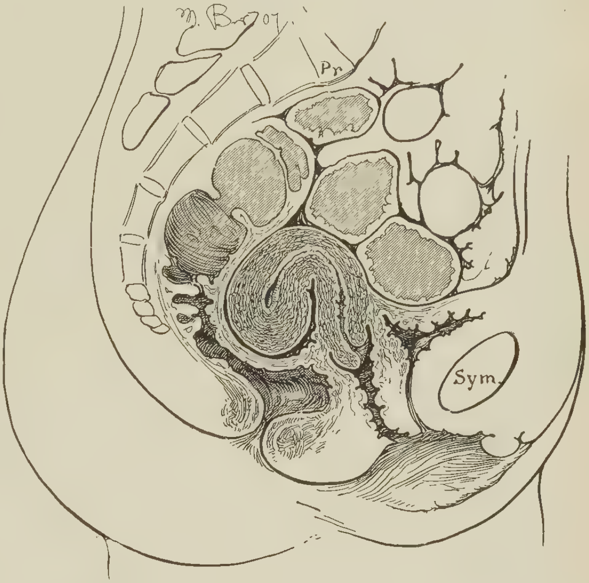


Fig. 99.—Acute Retroflexion of the Uterus which is Sometimes the Cause of Sterility, but more often Occasions Abortion in the Early Months.

Infantile or Puerile Uterus.—Women with scanty or irregular menstruation due to a small uterus, of infantile or puerile form, rarely conceive at all. Such a uterus, however, must not be confused with one which is merely slightly smaller than the average. In the infantile type the body of the womb is tiny, the cervix disproportionately large, and the ovaries also infantile (see Fig. 58, p. 136).

Myomatous Tumors of the Uterus.—Sterility is so often associated with myomata that there can be no doubt of a causal relationship between the two. Many women in whom myomata develop at an early age never conceive at all; others conceive and abort; and others, again, who apply to the physician for relief from large myomata when they are in the late thirties or early forties, give a history of having borne one or two children. When we consider the disturbances of menstruation which exist in such cases, the watery discharges from the mucosa, and the changes in the size and form of the uterus, together with the frequent displacements of the tubal orifices, the compression and distortion of the lumen of the tubes and the frequently associated disease of the adnexa, we wonder that such women should conceive at all. Olshausen, who has written more than any living authority on myomata, collected 1,731 cases from various sources, and found on analyzing them that 30 per cent were sterile. These figures, however, are probably not absolute. Schorler, following, as I have done in portions of this chapter, the excellent work of F. Schenk (*loc. cit.*), found in a statistical examination of 253 cases that sterility prevailed in 9 per cent of the polypoid myomata; in 18.70 per cent of the cervical; in 24.7 per cent of the interstitial; in 38.8 per cent of the submucous; and in 47.8 per cent of the subserous. Von Winckel found that of 108 cases examined by him, 41.6 per cent had had only one child. These figures, however, are not in accordance with the general vital statistics of Saxony, which showed only 22.7 per cent of one-child marriages in general.

After this apparently unanimous agreement touching the causal relationship of myomata to fertility, Hofmeier investigated 327 myoma cases and reached utterly different conclusions. He found, for example, that while 20.5 per cent of this group was sterile, 15.2 per cent of all his gynecological cases was sterile also. Thinking it hardly permissible to draw the conclusion that myomata stood in direct causal relationship to the sterility, he pointed out that the average age of the women in it was forty-two years and that the sterile marriages had lasted, on an average, sixteen years. He considered it improbable that the fibroid could have begun to cause the sterility as early as the twenty-sixth year in the absence of any symptoms; and therefore he was of opinion that as the sterility almost invariably dated from a time of life when it was highly improbable that myomata existed they could not be supposed to exercise any influence upon its causation. For instance, out of 326 women with myomata, 202 had had children, an average of 3.2 to each woman. Now the average of all the married women in Bavaria, Saxony, and Prussia, is 4.5 per cent, so that the difference is not great. Here, also, Hofmeier considers that the sterility begins too far back to have been influenced by the myoma appearing so many years afterward.

Hofmeier follows another line of argument when he notes that out of 503 cases of primary and secondary sterility, where there were no children, or only a single birth occurred within the first five years of married life, there were only 7 cases with fibroids, and of these 7, the sterility in 4 was explicable on other grounds. On the other hand, Hofmeier claims that the presence of myomata in women of more advanced age actually favors conception, as he found that in a series of 23 pregnancies complicated with myomata, only one was under thirty, while 13 were between forty and forty-seven years of age. He claims that this group of cases is evidence that myomata are the cause of an increased activity of the whole sexual apparatus, not of the ovaries alone, and that this is the reason the sexual organs preserve their function so much longer than is usual in cases of fibroids.

This question is still the subject of discussion, but in my opinion, the following facts may be considered as established in regard to it:

(1) That the presence of fibroid tumors acts as a hindrance to conception and this hindrance becomes greater as the tumors increase in numbers and in size.

(2) That the influence of fibroid tumors is felt long before they are recognized clinically, and that they may prevent conception while still of small size, that is to say, twelve or fifteen years before they are perceptible.

(3) That they tend to induce abortion.

(4) That while fibroid tumors, as a rule, are an obstacle to pregnancy, it may occur in spite of them, even in advanced cases. Such cases always come before the attention of the gynecologist.

(5) That one common cause of the large amount of sterility in women with fibroids is the tubal and ovarian disease so often associated with them.

One important point which must be borne in mind in this connection is that a case of sterility, otherwise inexplicable, may be due to small myomata which are discovered only upon a most searching examination. Furthermore, in cases of sterility where the husband is sound and no apparent cause for the condition can be found in the wife, a fibroid tumor should be suspected if the uterus is clearly larger than normal and somewhat irregular in form.

Diseases of the Adnexa.—This is an interesting group of cases belonging to a class which are peculiarly difficult to investigate on account of the inaccessibility of the organs, namely, those cases in which the sterility is due to disease of the uterine tubes or the ovaries. It is because it is difficult to get at these organs and therefore to obtain an accurate knowledge of their condition that they are frequently forgotten in the clinical examination.

Maldevelopment of the uterine tubes is sometimes the cause of sterility. Such tubes are unusually long, often tortuous, and with little or no distinction between isthmus and ampulla, a condition which has also been reckoned among the causes of extra-uterine pregnancy. Again, the lumen of the tubes may be compressed by a fibroid tumor and they are liable to be distorted and impeded in their movements by common peritoneal adhesions as well as bound down and flexed by them. A mild attack of gonorrhea, which passes out into the pelvic peritoneum through the tubes, is sure to be followed by more or less extensive adhesions involving these delicate structures and interfering with their function. In the case of hydrosalpinx the lumen of the tube is completely occluded, so that no ova can be transmitted to the uterus and sterility is the inevitable result. Again, a suppurative infection of the uterine tubes (pyosalpinx) is often an efficient cause of sterility, and when it occurs in a woman who has never borne children, it is usually the result of a gonorrheal infection. I have just examined a woman, married eight years, without children and exceedingly anxious to have them, who is suffering from a large abscess of the right tube bulging forward into the abdominal cavity under the abdominal wall as well as a smaller one of the left tube.

Diseases of the ovary are not often a cause of sterility. The ovary is peculiarly persistent in the performance of its function from puberty to the menopause. When the other structures in the sexual apparatus are maldeveloped, the ovaries may be elongate and smooth, with no follicles of an infantile type (see Fig. 58, p. 136). Large Graafian cysts, two inches or more in diameter, may be associated with sterility, but how far they act in the prevention of conception is not yet determined. Blood cysts of the ovary are more serious hindrances, on account of the associated pelvic peritonitis imbedding both ovaries and tubes. Ovarian tumors, both cystic and dermoid, are an obstacle to conception, though they do not form an actual barrier to it. The most common cause interfering with the function of the ovary and preventing the extrusion of the ovum or its reception and transmission by the tube, is a pelvic peritonitis, due to an infection travelling through the uterus, out through the tubes, and onward to the pelvic peritoneum. The ovary, under these conditions, becomes completely embedded in a mass of adhesions, which may so far interfere with its circulation as to cause atrophy. Cases of ovarian abscess are rare and do not call for consideration in connection with sterility.

A parovarian cyst, such as is often found between the outer extremity of the uterine tube and the ovary, serves to fix, splint, and flatten the fimbriated extremity and to push it away from the ovary (see Fig. 100). This condition would seem almost of necessity to prevent the ovum from reaching the tube and the uterus, for which reason I present the figure. Positive evidence that it does so, however, is not as yet forthcoming.

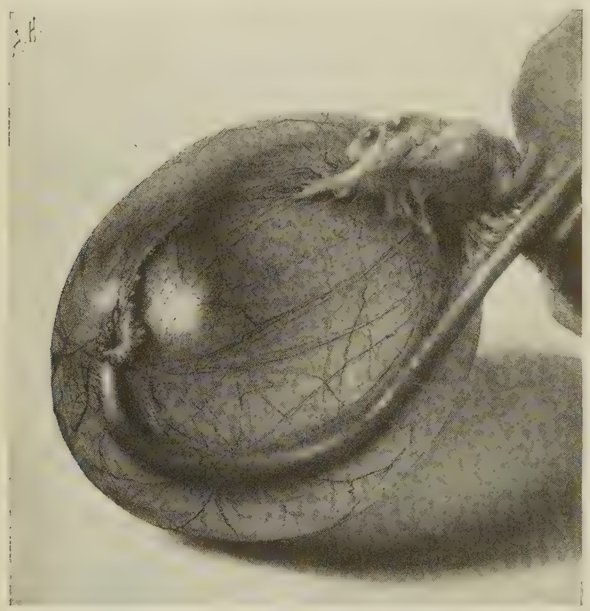


Fig. 100.—One of the Possible Causes of Sterility. A monocystic tumor, with clear watery contents, splinting the tube and separating it widely from the ovary.

General Diseases as a Cause of Sterility.—Many systemic affections are so constantly found associated with sterility as to demonstrate conclusively the existence of a causal relationship. The etiologic connection, in some cases, is quite clear, as when some general disease causes an atrophy of the uterus, that is to say, a withering in size of an organ which was previously of normal dimensions. A very severe labor may also cause uterine atrophy and thus occasion a one-child sterility. Other causes are tuberculosis and nephritis, as well as such acute infectious diseases as mumps, scarlatina, and acute rheumatism. The acute infectious diseases may also bring about a premature atrophy of the ovaries (see Chap. X). Conspicuous among the affections which may cause atrophy of the pelvic organs and consequent sterility are the chronic poisonings, alcoholism and morphinism. In both these conditions it is not uncommon to find a disappearance of the menstrual function for months at a time. Patients with aggravated heart disease also do not often become pregnant. Excessive fat seriously interferes with the function of the sexual organs; for example, out of two hundred and fifteen such cases Kisch found twenty-one per cent sterile. Gebhard associates the changes in the ovaries under these circumstances with those in the thyroid gland and suprarenal bodies. An enormous accumulation of fat may sometimes interfere with conception through the mechanical hindrance which it presents. The relation of obesity to changes in the sexual organs is discussed in Chapter VIII.

Violent psychical disturbance may be the cause of the disappearance of menstruation for a long period of time; such a case, for instance, is cited by Kisch, in which a woman went ten years without menstruating or conception, after seeing a child run over. The association of chlorosis with the disturbances of menstruation is interesting. According to Virchow there are two varieties of this condition, one in which the sexual organs are imperfectly developed and another in which there appears to be an excess of development; in the former group there is a complete amenorrhea and in the latter a menorrhagia (see Chap. VI).

Dyspareunia.—It is a moot question how far the absence of sexual desire (anaphrodisia) is responsible for sterility. If a sterile woman has no desire for the relationship and no satisfaction in its completion, she is sure to regard the fact as the cause of her disappointment and to give it a prominent place in her complaint. Kisch considers that the sexual feeling is a matter of importance, as he found twenty-six cases in which it was absent out of sixty-nine sterile women. Hegar, on the other hand, considers that the sexual inclination of women in general is, on the average, but slight and that it plays but little part in the question of conception. This group of cases may be divided, according to Strassmann, into three classes, namely:

(1) Those in which the sexual feeling is simply absent.
(2) Those in which there is a feeling of repulsion.
(3) Those in which the relation is actually painful.

I am myself inclined to believe that the simple absence of sexual desire, when the organs of generation are normal, has little or nothing to do with sterility. Sänger, quoted by Schenk, does not mention it once in a series of four hundred and eighteen cases.

Repulsion, on the other hand, may cause sterility, as in a case under my own care, where I discovered a rigid double hymen in a woman who had been married for a number of years. She told me that she had a strong repulsion toward the sexual act and that her husband had agreed not to touch her. In another instance, a beautiful young girl refused throughout some fifteen years of married life to allow her aged husband to touch her, on account of his awkward manner of approach.

Pain is operative as a cause of sterility when, owing to some local affection at the vaginal orifice or above the vault, the distress excited by the marital approach is so marked that the husband either occupies a separate bed or at least approaches his wife only at long intervals. I have also seen cases in which a decided pain was complained of, particularly on the left side above the vaginal canal, where nothing abnormal whatever could be discovered, although sometimes the suffering could be reproduced by digital pressure. Such cases belong to the neuroses and are met with in the class of women who complain excessively of pain in the course of examination of the pelvic organs, although no disease can be found. The occurrence of a localized pain, situated deep within the pelvis and most frequently felt toward the end of the sexual act, should always excite suspicion of a pelvic inflammatory affection and lead to a searching examination.

Vaginismus, a term proposed by Marion Sims, was used by him to designate a condition found in a certain class of women, who shrink from, or absolutely avoid coitus on account of a hyperesthesia of the vulva in the neighborhood of the hymen which induces strong muscular contractions. Sometimes the nervous apprehension is so great that the adductor muscles are thrown into a spasmodic condition, preventing the separation of the thighs; at others a lively nervous hysterical condition is excited, associated with a complete contraction of the sphincter vaginæ and levator ani which hinders any approach (see Chap. XII). This group of cases must not be confounded, however, with those in which the patient is simply hysterical and seeks to avoid the sexual act from lack of desire, nor with those other cases where the hymeneal vault is rendered exquisitely tender by little superficial ulcerative areas, a well-defined pathological condition of a gross character. Veit considers that in some cases, where the vaginismus is due to a neurosis pure and simple, the condition is often attributable to masturbation inducing an excessive local irritability. I have not, myself, seen any instances which I could attribute to this cause.

The marriage of cousins according to Mantegazza and G. Darwin, cited by Schenk, does not seem to occasion sterility. Goehlert, however, quoted by the same writer, concludes from a study of the royal families of Europe that blood relationship in marriage, repeated for generations, is a serious element in its causation, showing that of one hundred and eighteen marriages related by blood in the dynasty of the Capetinger forty-one were sterile; in the house of Wettin seven out of twenty-eight; in Wittelsbach nine out of twenty-nine; in that of Hapsburg-Lothringen eight out of twenty-five; that is to say, out of two hundred marriages between blood relations, sixty-five or thirty-two and five-tenths per cent were sterile.

TREATMENT.

The first step in the treatment of sterility is to investigate the cause, and the first thing to be done in such an investigation is to inquire into the condition of the would-be mother, remembering that only grave and for the most part self-evident diseases, whether local or constitutional (except diabetes and nephritis), are likely to hinder conception. The next point to be considered before planning a course of treatment, is whether one or both would-be parents are affected, and to this end the condition of the husband should always be investigated. As a rule, the husband should not be questioned in the presence of the wife, for every man who exacts purity in his wife in her antecedent relations will naturally profess before her to have lived up to no lower standard himself.

When the husband is questioned alone, it is worth while, in America at all events, to inquire whether his life before marriage was one of purity and continence. If he admits illicit relations, then it is well to ask whether he has had syphilis or gonorrhea, and, if he has had gonorrhea, whether one or both testicles were affected; also whether he had a protracted gleety discharge with the gonorrhea, and whether such a discharge was present at the time of his marriage. The questioner must remember that many men, who have stimulated an old and latent gonorrhea into fresh activity in the first months of married life, are inclined to consider the resulting discharge as nothing more than the natural results of excess.

In examining both the man and his wife it is well to follow some scheme, like that adopted by F. Kehrer (*loc. cit.*, p. 78), or like a somewhat fuller outline such as that which I present on pages 352 and 353. A series of records kept on a scheme of this kind would be of great statistical value in this country.

No matter what the find in either case both husband and wife should always be examined. If the husband is found to be at fault, the gynecologist would do well to refer him to a competent andrologist (Sänger) commonly known to-day as a "g.-u. specialist." Pinard says that the husband should never be told that the case is hopeless, as he has known two or three to take their own lives under such circumstances. The physician may almost always assure the husband with azoö-, oligo- or necrospermia that there is a hope of his recovery, for numerous cases can be recalled, in the hands of different specialists, in which after repeated examinations a few living sperm cells have been found and where, though long delayed, conception has taken place.

In making a diagnosis of the cause of sterility in the woman preparatory to treatment, the examiner must bear in mind three things:

(1) Can any obstruction be discovered which is likely to interfere with the progress of the ovum to the uterus?

(2) Is there any mechanical hindrance which prevents the progress of the spermatozoa upward into the cervix, through the uterus, and out into the uterine tubes, where conception normally takes place?

OUTLINE FOR EXAMINATION OF HUSBAND.

Name.

Age.

Year of marriage.

Sexual history before marriage.

General appearance and present state of health.

Condition of testes and epididymis.

" " *vasa deferentia.*

" " *vesiculæ seminales.*

" " *prostate gland.*

Coitus normal?

Average frequency of coitus.

Condition of semen, examined after ? days' interval since last coitus.

Manner in which semen was obtained.

Semen examined ? number of hours after coitus.

Manner in which semen is preserved.

Microscopical examination—Normal. Necrospermia. Oligospermia. Azoöspermia. Prostatic cells. Pus. Gonococci. Cholestearine balls. Corpora amylacea.

OUTLINE FOR EXAMINATION OF WIFE.

Name.

Age.

Year of marriage.

Pregnancies, miscarriages.

General appearance and present state of health.

Previous diseases, especially of an infectious character.

Menstrual history, as to regularity, duration, amount, and presence of pain.

Leucorrhea, especially any discharge first noted after marriage.

Suspected abortions.

Infections following abortions.

Previous gynecological affections and treatments directed to the relief of sterility or uterine disease.

Any abnormality about the vulva,
vagina,
cervix,
uterus,
uterine tubes,
ovaries,
sexual feeling.

Diagnosis of cause, or probable cause of the sterility.

(3) Is there any endometrial condition (polyp, myoma, endometritis) which is likely to prevent the attachment of the fertilized ovum?

He must then look for any gross disease of the vulva, vagina, or cervix. Next he must examine the uterus in order to ascertain the presence of tumors or displacements; and, finally, he must investigate the condition of the ovaries to determine whether there is any disease, characterized by enlargement, already evident on bimanual examination. If he finds no cause for the sterility in any of these localities, he reviews the case for a gonorrheal infection, taking specimens of urethral, vaginal, or cervical secretions for microscopical examination.

The following conditions associated with a sterility are susceptible of relief:

(1) Imperforate hymen.
(2) Vaginismus.
(3) Retroflexion.
(4) Anteflexion.
(5) Endometritis.
(6) Stenosis of the cervix.
(7) Uterine polyp.
(8) Fibroid tumor.
(9) Parovarian cyst.
(10) Ovarian and dermoid cysts, when unilateral.
(11) Gonorrheal infections of the genital tract below the uterine tubes or above the uterus, if one-sided.
(12) Various other infections, which it is not necessary to differentiate.

The conditions which are not susceptible of relief are these:

(1) Absence of the vagina and of the uterus.
(2) Infantile uterus and ovaries.
(3) Extensive fibroid tumors of the uterus.
(4) Extensive inflammatory changes.

If nothing can be found on making the usual careful bimanual examination, the patient should be anesthetized and the pelvis explored. If no fault is then found, a thorough dilatation of the cervix should be done and, if called for, a curettage (see Chaps. IV and VII).

An imperforate hymen is best treated by complete excision (see Chap. VI). If there is any vaginismus it must be treated as laid down in Chapter XII.

In sterility of long standing, a retroflexion ought to be corrected. First a pessary may be tried, and then, if that does not relieve the situation, an operation, drawing the uterus forward by its round ligaments. Anteflexion of an extreme character is rather a sign of maldevelopment than a mere postural disorder. Here the cervix may be dilated and then divided back to the vault in the median line. A plug of gauze left in for a few days will serve to keep the wound open.

Endometrial conditions are best treated by curettage. Cicatricial stenosis is still the commonest discoverable cause of sterility, and when no other condition can be found to account for it, it is safe to consider this the probable hindrance. The dilatation for its relief should be done thoroughly, at one sitting, using a small, a medium, and a large dilator in such a manner as to open the cervix widely, without tearing it.

The details of the operation are described in Chapter IV, but I add a word of emphasis here in regard to one or two important points. The best dilators for the purpose are the parallel dilators of the Goodell-Ellinger type. The cervix should be equally dilated in all directions, up to and including the internal os, until it is sufficiently stretched to admit a bougie eight to ten millimetres in diameter. I do not think it advisable to dilate the cervix every month. It is wiser to correct the trouble, and then let nature have a chance to regulate her functions. Neither do I place any great confidence in the various cutting operations practised on the cervix and still less on those more dangerous operations involving the cervical canal (discission). I have already spoken of two precautions which should attend every dilating operation, which, in my opinion, should never be called "a little operation" or "no operation at all"; but it may be well to repeat my caution here.

(1) The physician must be sure that there is no intrapelvic inflammation, which would be liable to be lighted up by this manipulation. I have seen some distressing cases, in which the patient was said to have been "perfectly well until the doctor dilated the womb," after which a latent infection flared up, until the pelvis filled with pus, all in consequence of neglect of this precaution.

(2) The same care as to cleanliness of the vulva, the vagina, and the instruments must be employed as in a major operation. Carelessness in this particular also may light fires which can only be extinguished by the sacrifice of all the structures concerned.

In most cases where dilatation of the cervical canal is necessary, the patient suffers more or less from dysmenorrhea, and curettage is called for as well. It is well, however, to warn the patient that she must not expect conception to take place at the very next period, but be content to wait patiently for at least a year.

A uterine polyp may be suspected as the cause of the sterility when the menstrual flow tends to be hemorrhagic, or when the uterus is enlarged, or when the polyp can be seen or felt at the external os. It should be removed by surgical means.

Fibroid tumors may be removed by enucleation rather than by amputation of the uterus, with the hope of subsequent pregnancy in younger women. Out of ninety-four abdominal myomectomies, performed in my clinic, where pregnancy was hoped for, it occurred in thirteen. Of this number twelve went to term, and one miscarried. Out of thirteen vaginal myomectomies where pregnancy might be looked for, it took place in two.

Parovarian cysts, unless very large, can be removed readily, sparing the uterine tube and the ovary.

When no gross lesion exists, gonorrhea must be sought for. To this end a cover slip ought to be taken in every case, without exception, and examined for intracellular diplococci (gonococci). The discovery of gonorrheal infection gives the treatment a definite object, namely, that of removing the infection from its various resting places.

If the disease has progressed as far as the peritoneum, involving the ovaries in adhesions and converting the tubes into sacs (hydro- or pyosalpinx) the case is not a hopeful one, as far as the cure of the sterility is concerned. If there is pus in the tubes, the best plan is to refer the patient to a gynecologist who may open them freely, and make a wide drainage opening below into the vagina; even under such conditions, conception may occur after the parts have recovered from the operation. Delicate restorative operations done on closed tubes are but rarely successful in bringing about conception. When the gonorrhea affects the cervix, which is its seat of predilection, and where next to the tubes it does most harm, the best plan is to burn it out with a Paquelin cautery or scrape it out with a Craig's curette, as described in Chapter XI. In one of my patients, thirty-two years of age, who had an acquired sterility of twelve years' standing, I found a large everted cervix pouring out a mucopurulent secretion. Three cauterizations with a Paquelin cautery, after Hunner's method, cured the discharge and fifteen months later she bore a healthy child (Mrs. S., Case-book XVI, No. 84, Jan., 1906). The vagina should be treated as described in Chapter XI, or as recommended by Sänger, with a fifty per cent solution of chloride of zinc, applied thoroughly with a large cotton applicator, care being taken not to burn the external genitals. Following this application a loose pack of gauze, coated with zinc oxide salve, may be inserted and left *in situ* for twelve to eighteen hours. Any gonorrheal affection of the external glands should be relieved, and an infected vaginal gland should be incised. Skene's glands (para-urethral) should be probed and cut down into through the vagina, so that they are opened and drained to the very bottom. This little operation may be done under a two per cent solution of cocain injected into the adjacent tissues.

CHAPTER XVI.

GONOCOCCUS INFECTION (GONORRHEA).

History and general considerations, p. 357. Prevalence, p. 358. Organs usually affected, p. 358. A constitutional as well as a local disease, p. 358. Description of the gonococcus, p. 359. Different tissues in which the gonococcus is found, p. 360. Gonotoxine, p. 361. Curability of gonococcus infection, p. 362. Clinical course and symptoms, p. 362. Acute gonococcus infection; sub-acute and chronic gonococcus infection, p. 362. Vulvo-vaginitis in little girls, p. 363. Latent gonorrhea, p. 366. Gonorrhea and marriage, p. 366. Diagnosis, p. 366. Treatment, p. 371.

Gonococcus infection is a better name than gonorrhea, time-honored though the latter is, because it does not carry with it necessarily the stigma of a venereal disease. This consideration is especially important in vulvo-vaginitis in children where there is often no suspicion of a direct venereal origin of the infection.

History.—The disease is of great antiquity; it was common among the Greeks and Romans, and even before that time there are references to it in literature. In the fifteenth chapter of Leviticus careful instructions are given to the Israelites as to the measures to be adopted to avoid contagion from a running from the urethra. It is not probable that the nature of the disease was fully appreciated until recent times, the term gonorrhea signifying a flow of semen (*γόνος*, semen, *ῥοία*, flow). In the year 1857 Bernutz and Goupil published an authoritative treatise on the influence of gonorrhea in the causation of pelvic peritonitis and salpingitis. Its recognition as a frequent cause of serious uterine diseases was not determined, however, until Emil Noeggerath issued a monograph on the subject in 1872. His paper on latent gonorrhea read before the American Gynecological Society four years later evoked a storm of protest from the medical profession. He claimed that gonorrhea in the male as well as in the female persists for life in certain sections of the organs of generation, notwithstanding its apparent cure in a great many instances. There is a form of gonorrhea in both sexes called latent gonorrhea, which may infect a healthy person with either acute gonorrhea or gleet. Latent gonorrhea in the female manifests itself as acute, chronic, or recurrent perimetritis, or ovaritis, or as catarrh of certain sections of the genital organs; finally, about ninety per cent of sterile women are married to husbands who have suffered from gonorrhea either previous to, or during, married life.

Noeggerath's views, although extreme, are, in the main, held to be true to-day. The discovery of the gonococcus by A. Neisser in 1879 served to put the investigation of the prevalence of the disease in women, as well as its varied manifestations, on a proper scientific footing. It was nearly twenty years, however, before many observations based on exact bacteriological knowledge were put on record.

Prevalence.—The prevalence of gonococcus infection in women varies within wide limits, according to the views of different gynecologists. It is by no means uncommon in little girls, especially in institutions. This subject will be taken up in some detail farther on. It is sufficient to say here that most of the cases of purulent vulvo-vaginitis in children are now believed to be of gonococcus origin. I have just noted the conclusions of Noeggerath as to the frequency of this disease. Lomer found the diplococcus in sixty per cent of the gynecological patients of Schroeder's clinic. Sänger and Schwartz (*Centrbl. f. Gyn.*, 1896, vol. 20, p. 1075) put the percentage of gonorrhea among all their patients, hospital and private, as low as twelve per cent. Taylor, viewing the matter from the standpoint of the venereal specialist, says that twelve per cent is a conservative estimate of the gonorrheal origin of all uterine diseases.

This great diversity of opinion can be accounted for in several ways. First, the difficulty of finding the scattered organisms in the chronic cases. In the acute cases and under favorable circumstances the gonococci are often not very numerous, only four to a dozen being found in one microscopical field. Second, we know that under certain conditions the cocci die, whether from lack of suitable nutrient material, from the activity of the phagocytes, or from other causes. But although they are dead, the tissues in which they occur are still infected, perhaps because of the "gonotoxine" generated in the dead cells. Third, the class of patients treated. We should expect to find gonorrhea most common among prostitutes, and statistics prove this to be the case. Among five hundred and thirty-three prostitutes, sick and well, examined in the regular routine by Huber (*Wien. med. Wochenschr.*, 1898, p. 24) fifty-nine and six-tenths per cent had gonorrhea. Prowe (*Centrbl. f. Gyn.*, 1901, vol. 25, p. 82) found gonorrhea in seventy-six and nine-tenths per cent of four hundred and seven sick prostitutes in San Salvador, Central America. Zweifel thought the number of women in his private practice who were ill because of the gonococcus was from ten to eleven per cent. Some writers place the percentage among private patients as high as twenty per cent. Obviously information on this point is difficult to obtain, for few statistics are published, physicians not caring to go on record.

Organs Usually Affected.—The organs in woman usually affected by the gonococcus are the vulva, urethra, vagina, uterine canal, and uterine tubes (see Fig. 101). Destructive inflammation of the tubes and ovaries with peritonitis is common. Gonococcus inflammation of the rectum and gonococcus infection of the bladder with secondary ascending inflammation of the ureters and kidneys is not rare.

That the disease is a serious one and rebellious to treatment there can be no doubt. The Committee of Seven of the American Medical Association, in a recent report to the Association, asserted that eighty per cent of the deaths from female pelvic disease are due to gonococcus infection. We have to consider not only the manifestations of the disease in the genito-urinary organs but also its effect on distant organs, such as gonococcus arthritis, especially of the knee joint, and its effect upon the system, in causing anemia and debility. F. R. Sturgis (*Amer. Jour. Urol.*, N. Y., 1904–5, vol. 1, p. 349) draws a parallel between the constitutional effects of syphilis and gonorrhea. He considers that many of the same organs are attacked by both diseases, and that gonorrhea may be likened to syphilis in the seriousness of the systemic disturbances it causes, not the least of these being impoverishment of the blood state and rheumatism, with attendant gonococcus endocarditis. Out of an ample experience as clinical professor of venereal diseases in the University of the City of New York, he deprecates the silly belief of those who consider gonorrhea as no more important than a cold in the head.

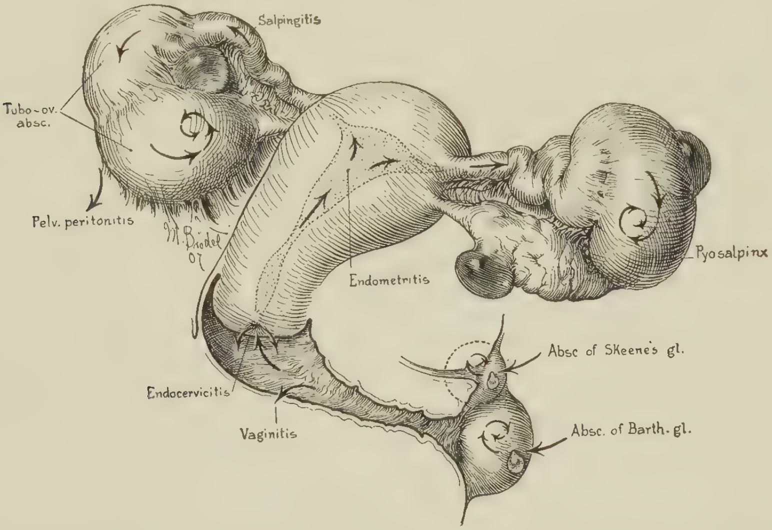
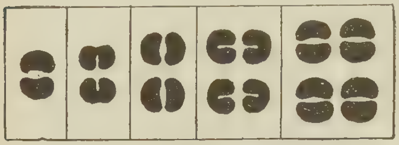


FIG. 101.—THE VARIOUS SITES IN WHICH THE GONORRHEAL ORGANISM IS APT TO BECOME IMPLANTED AND LINGER. These are: Skene's glands; Bartholin's glands; the vagina (in the young); the cervix; the endometrium; the uterine tubes; and the ovarian follicles. The whorled arrows mark the sites in which the infection lingers by preference.

Description of the Gonococcus.—The gonococcus according to E. Bumm (J. Veit's "Handbuch der Gynäkologie," vol. 1, p. 430), who has studied it extensively, belongs to the diplococcus group as far as its form goes, and to the staphylococcus family in its mode of development. It is a pus-producing bacterium affecting chiefly columnar epithelium. The accompanying figure shows the shape of the coccus, not unlike two grains of coffee with the furrows on the concave sides, each half being generally separated from its sister half by a well-marked interval (see Fig. 102). Sometimes the two halves are joined at one end as shown, and sometimes they are of irregular size (Maslovski). The coccus measures about one and a quarter millimetres in diameter.

It is sharply differentiated in appearance from the white corpuscle in which it has its habitat, so that it can be recognized with ease. It increases by division in vertical planes to form clusters, never chains, of new cocci. It takes the aniline dyes with great readiness, but always loses its color by the Gram method of decolorizing. In secretions it usually lies within the protoplasm of the pus cell, although occasionally it is found free.



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FIGS. 102 and 103.—THE GONORRHEAL ORGANISM, GONOCOCCUS OF NEISSER. (102) A series of forms of individual cocci, biscuit-shaped and double, highly magnified; (103) groups of cocci which are characteristic, especially the presence of the cocci within pus cells above. (From Veit, "Handbuch der Gynakologie," Bd. I, p. 430.)

Tissues in Which Gonococcus Is Found.—The gonococcus has an especial affinity for the mucous membranes of man. It is not, as formerly thought, limited in its place of growth to the columnar epithelium. It has been found in the sub-mucous tissues of the vagina by Mandl; in squamous epithelium by Bumm, Touton, and others; in the thrombosed blood vessels of the bladder, in the serosa of the peritoneum, and in the substance of the ovary by E. Wertheim; in the connective tissue of the uterine tubes by Kraus; in the rectal mucous membrane by Fritsch; in the uterine muscle by Madlener and Menge; in the decidua and placenta of a nine months pregnancy by Maslovski, and in the urine of cystitis by Melchoir. Krönig (ref. to by F. Staehler, *Monatss. f. Geb. und Gyn.*, 1903, vol. 17, p. 77) found gonococci in the lochia of over ten per cent of two hundred and ninety-six lying-in women who had had child-bed fever. Lobenstine and Harrar (*Bull. Lying-in Hosp.*, N. Y., Dec., 1906) found that the average birth-weight of the babies of "gonorrheal mothers" is less than that of babies of "normal mothers." Their deductions were based on the observation of fifty babies of gonorrheal mothers without fever, fifty babies of gonorrheal mothers with high temperatures, and one hundred and fifty of normal mothers. Not only is the average weight less, but there is a greater permanent loss, babies of gonorrheal parentage gaining at the end of ten days only ten and nine-tenths per cent, while babies of normal mothers gain forty-nine and three-tenths per cent. They consider that gonorrhea occurring in the mother in the later months of pregnancy is the cause of a large number of premature births.

In places other than the genital organs and their neighborhood, the gonococcus has been found in the pus of inflamed joints by Stern and Jacquet; in the pus of an inflamed tendon sheath by Krönig; and in the mucous membranes of the oral cavity, nose, middle ear, and the conjunctiva of the new born by Dohrn, Rosinski, Von Leyden, Krönig, and others. The gonococcus has been isolated also from a thrombus of the pulmonary valve in a case of ulcerative endocarditis by Lenhartz, and in the blood current by Amann, Unger, Von Leyden, and Michaelis. Amann proved the identity of the gonococcus by stain and culture, and, by experimental inoculation of the human urethra produced a typical attack of gonorrhea complicated by inflammation of tendon sheaths.

The gonococcus may be cultivated outside the body by using as a culture medium human serum in the form of hydrocele, ovarian, or ascitic fluid together with agar, and may be kept alive for several generations. It is to be noted that it grows only in neutral or alkaline media. Therefore the normal vaginal secretion made acid by the lactic acid bacterium of Döderlein is hostile to its growth.

Gonotoxine.—De Christmas (*Ann. de l'institut Pasteur*, 1900, p. 331) found that there is a toxic product of the gonoccoccus developed after the cultured organism is dead, and that this is capable of producing suppuration when injected into the eye of a rabbit. His work was confirmatory of the investigations of Wassermann (*Berl. klin. Wochenschr.*, 1897, No. 32, p. 685) and Maslovski (*Ann. de gyn. et d'obst.*, 1899, vol. 2, p. 483), who experimented with pure cultures of the gonococcus in nutrient media to which, after the cocci had attained their full growth, alcohol was added to destroy them and to precipitate the albumen. The dead cocci with the albumen were then filtered out of the fluid, mixed with sterile water, the alcohol driven off by heat, and the fluid so obtained used to inoculate rabbits and guinea-pigs. The injections were found to be exceedingly poisonous and produced both local inflammations and pyrexia typical of gonorrhea. The filtrate, when injected into the animals, had no effect, showing that the poisonous properties were in the dead cocci. Maslovski considered that when the gonococci die, a gonotoxine is developed in the body of the cocci, an endotoxine. It is to this toxine that the symptoms of gonorrhea are due rather than to the development of the gonococci in the organism. He found the toxine to have both a local action, inflammatory and suppurative; and a general action, elevation of temperature, loss of weight, etc. Repeated injections of the gonotoxine produced no immunity, neither did injections of the pure cultures; therefore there is no immunity in gonorrhea, and reinfection may take place in the same individual an indefinite number of times. This coincides with the clinical observations of the disease in man. According to the most recent and approved views mixed infection is not often present in gonorrhea. In other words the gonococcus generally has the field to himself. By the destruction of the surface epithelium as a result of gonococcus inflammation the conditions are made favorable for the invasion into the tissues of the staphylococcus, streptococcus and colon bacillus, which are frequently found after the gonococcus inflammation may be said to be at an end. It is likely that some, at least, of the manifestations of the later stages of gonococcus infection are due to the formation of the gonotoxine and not to the invasion of other organisms. Taking advantage of the discovery of the gonotoxine, some attempts have been made to treat gonococcus infection by the injection of antigonococcus serum (J. C. Torrey, *Jour. Amer. Med. Assoc.*, vol. 46, p. 261, also J. Rogers, *ibid.*, p. 263), but so far the results are not convincing.

Curability of Gonococcus Infection.—Jullien (*Rev. internat. de méd. et de chir.*, Paris, 1905, vol. 16) discusses the curability of gonorrhea, adopting Wertheim's view that in chronic gonorrhea a fresh attack may be lighted up by a new culture ground. There is no real immunity, that is to say, if a man having chronic gleet, marries a healthy woman, she acquires gonorrhea from him, and then her gonococci are able to set up an acute process in the husband's urethra. This is the opinion commonly held to-day, but it is founded more on clinical observation than on bacteriological evidence. The importance of a man being cured entirely of gonorrhea before he is married is made doubly apparent. Most authorities maintain that the disease may be eradicated by persistent treatment conducted over a long period of time. Every individual who has once had gonorrhea should be assumed to be infected until the contrary has been proved.

Clinical Course and Symptoms.—Acute gonorrhea, as seen in prostitutes, is characterized by a chill, rapid pulse, elevation of temperature, pelvic pains, burning and smarting on urination, and, in the course of a few hours by a leucorrhea, at first mucous, but soon becoming purulent, the pus often being of a greenish hue and mixed with blood. The symptoms begin from twenty-four hours to eight days after infection. Exceptionally, they begin before twenty-four hours or are delayed as long as fourteen days. The disease begins most frequently in the urethra, just as in the male. The meatus urinarius, as I have already pointed out ("Twentieth Century Practice of Medicine," vol. 1, p. 665), is protected in the young woman by the labia urethrae. In the beginning of coitus the glans penis pushes against the labia and separates or invaginates them, bringing discharge from the male meatus directly in contact with the mucous membrane of the female meatus. The glands of Skene lie just in the edge of the female urethra; they are lined with columnar epithelium, the favorite habitat of the gonococcus. Therefore, it often happens that these glands are infected. Another favorite seat of infection is the glands of Bartholin, on either side of the entrance of the vagina just outside the hymen. These also are lined with a layer of columnar epithelial cells. The impact of the penis in its endeavor to enter the vagina causes more or less trauma of the tissues over these glands and gonococci laden discharge from the male meatus is rubbed into them. The vagina, lined with pavement epithelium and bathed in an acid secretion, is infected, although less commonly than the urethra. The younger the patient the more apt is the vaginal mucosa to be infected, because in the young, the pavement epithelium is softer and more like columnar epithelium. Hence the frequency of gonococcus vulvo-vaginitis in children.

The mucous membrane lining the cavity of the cervix uteri is thrown into folds and has branching glands lined with ciliated columnar epithelium. This is the situation next most commonly affected. Here the disease is prone to lurk, just as in the glands of Skene and Bartholin. An acute gonococcus infection generally involves the urethra, vagina and cervical canal. It runs a course of six weeks. The inguinal lymphatic glands which receive infective material from the vulva and lower vagina may become inflamed and may suppurate, and the patient has a "bubo." This complication is more common in women of uncleanly habits. A gonococcus arthritis occurring during the course of the disease is a frequent complication.

Acute gonorrhea as described, except among prostitutes, is relatively rare. The symptoms of the invasion of the gonococcus in the genital organs of women are generally not pronounced. They are often, a smarting on urination and an increase of vaginal discharge. The only history of infection may be that a mucoid, unirritating, leucorrheal discharge became purulent and irritating, but even this sign may be absent. Perhaps the first symptoms to lead a patient to consult a physician will be due to tubal disease, a cervical catarrh, or a vulvo-vaginal abscess, so insidious are the stages of invasion of this disease. In the chronic forms of gonococcus infection the leucorrhea loses its purulent character and is generally abundant. The symptoms depend on the organs chiefly involved, whether the vulvo-vaginal glands, the urethra and Skene's glands, the uterine canal, or the uterine tubes and peritoneum.

Vulvo-vaginitis in Little Girls.—Fluor albus in children was first mentioned in the eighteenth century, and, although it has been often referred to in treatises on the diseases of women and children, its serious import has not received sufficient attention. Sara Welt-Kakels (*New York Med. Jour.*, 1904, vol. 80, p. 689) observed in her clinic at the Mount Sinai Hospital, New York, during the ten years from 1893 to 1903, one hundred and ninety cases of vulvo-vaginitis, or one and six-tenths per cent of all the children treated. The largest number occurred in children between the ages of two and five years and the disease was rare after the tenth year. I show in Figure 103 a retouched photograph of a case of gonorrheal vaginitis in a little girl eleven years old, sent to the Johns Hopkins Hospital wards; the overflowing secretion as it pours out of the vagina into the perineum is characteristic. Not all of the cases were of gonococcus origin. L. Emmet Holt (*New York Med. Jour.*, 1905, vol. 81, p. 521) reports the results of investigations made in the Babies' Hospital and other institutions for children in New York. When the new building of the Babies' Hospital was opened in 1902, a child with gonococcus vaginitis was inadvertently admitted. From this child, in spite of new wards and the cleanest of surroundings, eleven fresh cases developed, including three of gonococcus arthritis. The rule was thereupon established to admit no female child without a microscopical examination of the vaginal secretion. In another infants' hospital in the same city, where there was said to be no vulvo-vaginitis, smears were made from the vaginal secretion of one hundred infants and young children, the cases being taken in order, without selection. Twelve showed a yellow purulent discharge, and pus and gonococci were found in all by microscopical examination. This must be considered a large percentage, as most authors place the frequency of vulvo-vaginitis as about one per cent.

Not all cases of vulvo-vaginitis are of gonococcus origin, the cause of the so-called catarrhal cases being unknown. The gonococcus form comprises nearly all those in which the discharge is purulent; it is the most severe and most rebellious to treatment besides being the most common. Although the inflammatory symptoms disappear at the end of four to six weeks, exacerbations occur. One author reports finding gonococci in the discharges after the disease had lasted four years. Gonococcus vulvo-vaginitis in children is contracted sometimes through sleeping with the mother, sister, or other female relative; as a rule, the infection is indirect and accidental, being transmitted on contaminated bed linen, towels, sponges, or even by bathing in the same bath tub. A marked instance of the last mode of contagion was an epidemic of vulvo-vaginitis which occurred in the city of Posen, Germany, in 1890 (ref. to by Welt-Kakels, *loc. cit.*), in which two hundred and thirty-six school girls, aged from six to fourteen years, were taken ill inside of eight to fourteen days with vulvo-vaginitis. They had all used the same public bath house, where, on account of limited accommodations, two or more children were required to bathe in one tub.

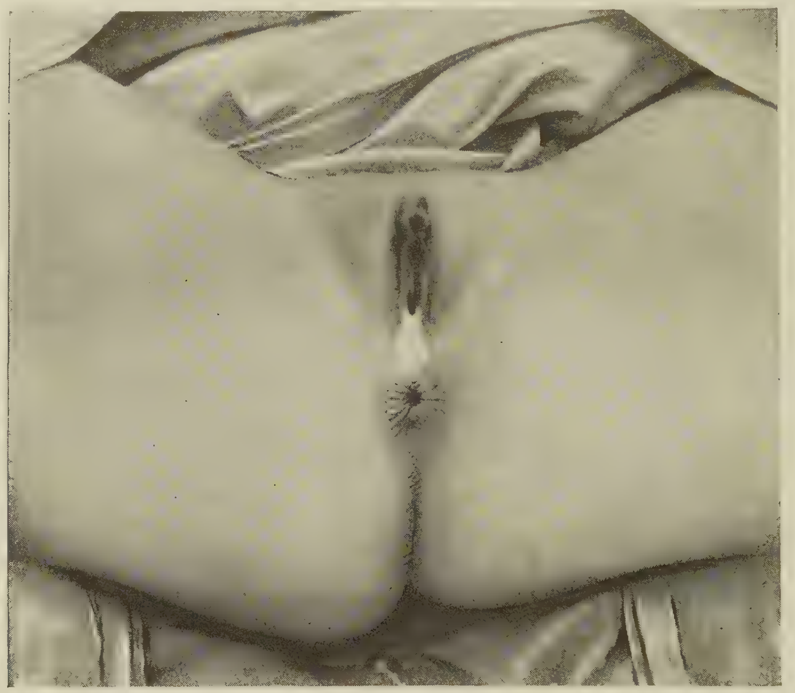

FIG. 104.—A CASE OF GONORRHEAL VAGINITIS IN A CHILD ELEVEN YEARS OLD, DUE TO RAPE. The highly infectious secretions are seen pouring out over the perineum. (This figure is made from a photograph.)

The statistics of venereal disease in children in my own clinic at the Women's Venereal Department of the Johns Hopkins Hospital Dispensary, under the charge of Dr. Flora Pollack, are as follows: In a series of one thousand three hundred and sixty-six patients, one hundred and thirty-nine, or ten and twenty-one per cent, were children under fifteen years of age; and of these, only three cases were congenital. Of the one hundred and thirty-nine children, ninety-five, or sixty-eight and three-tenths per cent, who were not over ten years of age, were suffering from acquired infection. In a number of cases this infection is intentional, being due to a superstition, prevalent among the lower classes, that the disease can be gotten rid of, if it is transferred to a healthy person, preferably a virgin.

The different forms of venereal disease were distributed as follows: Gonorrhea, one hundred and thirteen cases, or eighty-one and forty-one hundredths per cent; syphilis with gonorrhea, fourteen cases, or ten per cent; and syphilis alone, twelve cases, or eight and sixty-two hundredths per cent.

The accompanying chart (see Fig. 104) shows the ages at which gonorrheal infection is most frequently observed in the child. It will be seen that a large proportion of the cases (nearly seven per cent) are not over ten years old, a fact agreeing with the statistics of Welt-Kakels (*loc. cit.*); and there is every reason to believe that the infection in these children is not only acquired, but acquired through the intention of the other party, actuated by the superstition just mentioned.

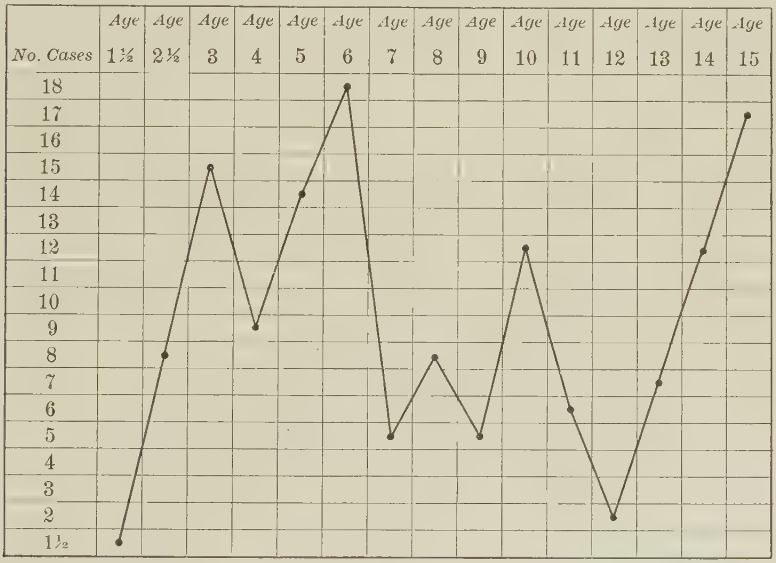

FIG. 105.—CHART SHOWING THE AGES AT WHICH GONORRHEA IS MOST FREQUENTLY FOUND BETWEEN EIGHTEEN MONTHS AND FIFTEEN YEARS. It will be seen that by far the largest number of cases occurs before ten years of age.

There are grounds for the belief that adhesions of the labia and prepuce, occlusion of the hymen and hamatocolpos, deformed uteri, and diseased uterine tubes are the sequelæ of this disease. The complications are acute purulent peritonitis, arthritis and ophthalmia.

Latent Gonorrhea.—Latent gonorrhea has been referred to (see page 357). It explains why the gonococcus, even after years of apparent cure, may regain its full virulence. This brings up the question of the advisability of marriage in persons who have had gonorrhea.

Gonorrhea and Marriage.—In the case of the male it is the custom for genito-urinary specialists to advise that marriage is permissible when there are no shreds in the urine, when the gleety discharge from the urethra has ceased, and when repeated examinations, made several days apart, show no gonococci in smears made from mucus from the meatus. There are cases on record, however, where these precautions have been observed and yet a gonorrheal process has been set up in the previously healthy wife. Other instances are numerous, where no disease was noted in the wife until the husband became reinfected by intercourse with a prostitute. It would seem as if reinfection was at the root of the trouble and would explain many of the otherwise inexplicable cases of gonococcus infection. In the case of women, repeated examinations of mucus from the meatus urethræ, after expression of the urethra, Bartholin's glands, and the canal of the cervix uteri, found to be free from gonococci, prove that the disease is cured. It is to be remembered that clinical evidence shows that the disease is more easily transmissible by a previously infected woman at or about the time of menstruation. This fact is explained by the congestion of the genital organs always present at this time, with the consequent liberation from the tissues of more abundant flora of gonococci. Something may be due to a diminished acidity of the vaginal secretion, which is ordinarily destructive to the gonococcus. Examinations for the gonococcus should be made, if possible, near a menstrual period.

Instances will occur to the mind of every practitioner of large experience, where a man who has had gonorrhea has had subsequently a family of healthy children; but this must be considered the exception, the rule being that such a man's wife is sterile, or has only one child, and that she suffers in the future from uterine disease. Prostitutes are notoriously sterile. The sterility is supposed to be due to gonococcus endometritis, to destruction of the ciliated columnar epithelium of the uterine tubes by gonococcus inflammation or to closure of their calibre from the same cause. Be that as it may, there can be no doubt that gonococcus infection is one of the most frequent causes of sterility in women.

Diagnosis.—In the acute form of gonococcus infection the diagnosis is not difficult. It is established by a history of suspicious intercourse, followed in a day to a week by the symptoms enumerated on page 362 and the finding of the gonococcus in the pus of the discharges.

In the sub-acute and the chronic forms the diagnosis is hard to make. It rests on a history of an unclean coitus; on the history of frequent and painful micturition (an acute urethritis being strong presumptive evidence of gonorrhea). It is not an uncommon experience to have the patient tell her physician that a little while after marriage she noticed that she had a leucorrhea which stained her linen and that her water smarted when she passed it. Questioning the husband at some subsequent time it is learned that he has had gonorrhea. Great tact should be exercised by the physician not to push his inquiries with the wife too far, because of the danger of causing marital troubles that no doctor can cure. In gonococcus infection of the innocent, by far the most common variety of the disease, it is seldom advisable to inform the woman of the exact nature of the disease she has acquired. It will never be done away with by too great frankness on the part of the physician. More is to be expected from missionary work with men, who should appreciate the dangers they run and the risks to which they are subjecting those nearest and dearest to them. Occasionally a patient will describe having had an adenitis in the groin or arthritis, but this is rare. The presence of the "maculae gonorrhoicae" of Sänger (*Centrbl. f. Gyn.*, 1896, p. 1073) is presumptive evidence of gonorrhea. These consist of a redness and puffiness, similar to the wheal caused by a flea-bite, at the orifices of Skene's glands and Bartholin's glands. The redness persists long after all active suppuration has ceased.

In examining a woman for chronic gonococcus infection it is important that she should come to the examination without previous douching or cleansing of the genitals. She is to be examined in the dorsal position, on a hard surface, and in a good light. The labia are separated and the discharge removed gently with pledgets of absorbent cotton. Smears are made from the pus expressed from the orifice of a gland of Bartholin. The physician's forefinger is inserted into the vagina, making backward pressure on the perineum to gain room and to avoid pressure on the urethra. Then the urethra is stroked with the forefinger from above downward, and any secretion which may be present is expressed, gathered at the meatus on a sterile probe or applicator, and transferred to a cover glass. The orifices of Skene's glands are carefully scrutinized for the presence of surrounding redness and pus. A speculum is introduced into the vagina, and with the aid of a sterile applicator a smear is made from the discharge from the cervical canal.

The detection of the gonococcus by staining and Gram decolorizing in the discharges is proof positive of the disease. Some authors (Calmann, Klein, and Fritsch) have insisted on the necessity of making cultures of the gonococcus. On account of the great difficulties surrounding the growing of this bacterium outside the tissues of the human body this is seldom done in practice, although it may furnish valuable confirmatory evidence. Finding the gonococcus in bits of tissue removed at the time of operations on the genitalia is proof of the nature of the diseased condition. Too often the diagnosis of chronic gonococcus infection must be only a probable one, because of the difficulty in finding the gonococcus.

Treatment.—In acute gonococcus infection rest in bed and scrupulous cleanliness are to be enjoined. It is not sufficient to tell the patient to be clean; exact instructions must be given as to the details. A sterile pad or soft cloth fresh from the laundry should be worn constantly over the vulval region. When it is wet with discharge, it is to be burned and a new one applied. The genitals are to be bathed at least three times a day with warm half per cent boric acid solution, and oftener, if the discharge is profuse. The very great danger of carrying infection on the fingers to other persons or to other mucous membranes of the same person should be pointed out. By this means it is possible to avoid gonococcus ophthalmia, a serious and destructive disease, especially in adults; and gonococcus vulvovaginitis in children, to say nothing of gonococcus proctitis. Huber (ref. to in *Centrbl. f. Gyn.*, 1889, p. 1508) found rectal gonorrhea in twenty-four and a half per cent of three hundred and eighteen prostitutes who had gonorrhea. It is important that the natural barrier of the sphincter ani should not be passed by a syringe nozzle or the examining finger during an attack of acute gonococcus infection. Because of the likelihood of spreading the infective material to neighboring organs it is unwise to use any further local treatment. It has happened only too frequently that gonococci of the cervical canal have been carried beyond nature's barrier, the internal os uteri, by the physician's sound, with resulting endometritis and salpingitis. So also the passing of a catheter during the acute stage of gonococcus infection is very likely to be followed by infection of the bladder. Coitus must be forbidden and the husband is to be kept under observation, if possible. The diet should be bland and free from spices and stimulants of all kinds; a milk diet is valuable. Large quantities of water should be taken to dilute the urine and wash away the gonococci, and the bowels should be moved daily with saline purgatives. Bromide, hyoscyamus, and opium in special cases are indicated to relieve pain and restlessness. A useful prescription to relieve painful urination is:

℞	Potassii acetatis	℥j
	Tinct. hyoscyami	℥j
	Aquæ	℥iij

S. One teaspoonful in a third of a tumbler of water every three hours.

Also:

℞	Copaibæ	℥iv
	Spts. eth. nitrosi	ʒvj
	Syr. simp.	℥ij

S. One teaspoonful in a wineglass of water every two hours.

In the sub-acute and chronic stages of the disease the object of treatment is the destruction of the gonococcus together with the superficial layers of epithelium. It is important that the treatment should be thorough, and no nooks and corners overlooked. The patient is placed in Sims' position and a small Sims' speculum introduced. The Sims' speculum is better for this purpose than other specula because it covers a minimum surface of the vagina. In the Sims' position the folds of the vagina are eliminated to a large extent by atmospheric dilatation, and thus all portions of it may be brought into contact with the remedial agent.

The vagina and vulva are wiped thoroughly, first with successive pledgets of absorbent cotton held in uterine dressing forceps and dipped in warm water, and then with dry cotton. The canal of the cervix is swabbed several times with cotton-wound uterine applicators, dipped into a ten per cent solution of silver nitrate.. Unless there is positive evidence that the infection has reached the uterine cavity proper, the tip of the applicators should not be passed through the internal os uteri. By steadying the cervix with a tenaculum, the treatment of the cervical canal can be accomplished in most cases without dilatation of the external os. Now and then slight dilatation with the Hanks' dilators will be necessary. The entire vagina is treated in the same way with pledgets of absorbent cotton soaked in silver solution until every fold and depression has been touched, the speculum being withdrawn as the posterior wall is painted from above down. The excess of silver solution is removed with dry absorbent cotton. The speculum is then lubricated and reintroduced into the puckered and whitened vagina, after which the entire cavity is given a copious smearing of vaselin, and two packings of non-absorbent cotton with strings attached are left in the vagina. Thus the danger of adhesion of the folds is obviated and the patient's comfort promoted. The packings are to be removed at the end of forty-eight hours.

The patient is now placed in the dorsal position. Unless there is evidence that the urethra has not become infected, a small Kelly endoscope (No. 8 or 9) is passed up to the neck of the bladder, but not into it. The urethra is then swabbed with cotton-wound uterine applicators, soaked in a five per cent solution of silver nitrate, the urethra being intolerant of a stronger solution except under anesthesia. As the reddened wall of the urethra rolls into the lumen of the cystoscope during its withdrawal, it is touched with the tip of the applicator. It is well to have at least two applicators ready for use and dipped in the silver solution before beginning the treatment, for economy of time is of value. The pain may be lessened in particularly sensitive patients by first inserting in the urethra an applicator with its cotton-soaked solution of cocain hydrochlorate (ten per cent). By holding the thumb against the shaft of the applicator the applicator may be withdrawn and the cotton left in the urethra. After five minutes the swabbing of the urethra with nitrate solution may be proceeded with. After the cystoscope is out of the urethra the orifices of Skene's glands receive special attention, so also the orifices of Bartholin's glands. In the chronic cases where Skene's glands are the seat of chronic infection they are to be injected with silver solution by means of a large hypodermic syringe needle, fitted into a two-inch section of rubber tubing or a new sterilized bulb of a medicine dropper. If the tubing is used, the free end is closed by tying it with a thread. This method of treatment and the best method of exposing the orifices of Skene's glands with bent hairpins held in forceps has been described by me (see Fig. 105). In obstinate cases of infection it is necessary to lay open the glands into the vagina. This is done under cocain anesthesia, using the cotton soaked in cocain solution as described in the treatment of the urethra. A fine probe is inserted to the full length of the gland (half an inch) and the probe is cut down on with a bistoury. Then the mucous membrane is cauterized with nitrate of silver solution, ten per cent. The glands of Bartholin receive the same treatment as Skene's glands. If an abscess has formed, it must be opened under aseptic precautions, and the interior cauterized.

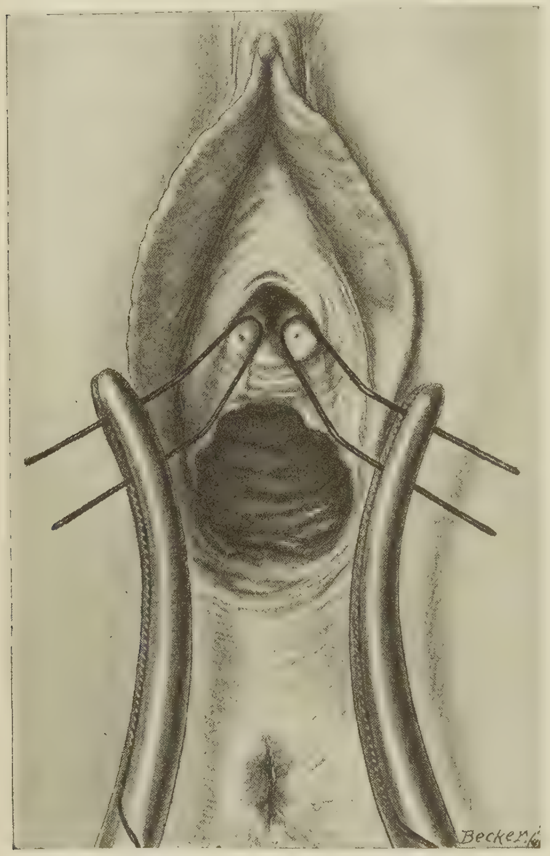

FIG. 106.—BENT HAIRPINS GRASPED IN ARTERY FORCEPS AND USED AS A SPECULUM TO EXPOSE THE ANTERIOR PORTION OF THE URETHRA, MORE PARTICULARLY THE ORIFICES OF SKENE'S GLANDS.

After all the points of infection have received attention the vulva is smeared with vaselin, and the patient is instructed to remove the tampons in two days and report. It may be necessary to repeat the treatment several times, at intervals of two or three days. Protargol in ten per cent solution may be substituted for the nitrate of silver. It is less irritating than the nitrate, and, although not as germicidal, has given the best results clinically of all the many silver salts with the single exception of the nitrate. The number of drugs recommended for the treatment of gonococcus infection is legion. Among them, leaving out the silver salts, may be mentioned Churchill's tincture of iodine, corrosive sublimate, formalin, permanganate of potash, methyl blue, brewer's yeast and nascent carbonic acid gas.

If the vagina remains congested as a result of the cauterization with the nitrate of silver, it is best to make several treatments with tampons soaked in ichthyol and glycerin (one drachm to one ounce) before renewing the more vigorous treatment. The nitrate of silver treatment is more or less painful, and in some patients it is advisable to administer a sedative after employing it. In cases where it is not possible to follow up this treatment, as where patients cannot be kept under observation or are subjected to reinfection, something may be gained by the use of vaginal suppositories of boroglycerid, gelatin, and protargol, two per cent. One or two of these suppositories, according to the size of the vagina, are to be inserted by the patient every night at bedtime and a napkin worn. Considerable benefit is obtained often in chronic cases by the daily use of a two-quart douche of hot permanganate of potash solution, 1:1500, or creolin, one half per cent.

The Dry Treatment.—In rebellious cases nothing is more efficacious than the use of iodoform powder dusted on dry elastic non-absorbent cotton tampons, so placed as to balloon out the vagina moderately, thus removing the folds from its mucous membrane. The packing should be done with the patient in the Sims' or the knee-breast position and repeated every third day, the patient removing the tampons on the night of the second day and taking a douche of permanganate of potash, 1:1500.

Treatment of Gonococcus Vulvo-vaginitis in Little Girls.—The mother is to be informed of the infectious nature of the disease and charged with the importance of carrying out the treatment with the greatest care. Strict attention is to be paid to cleanliness, and all cloths used about the child are to be burned after use. The mother or nurse is to prepare a warm solution of permanganate of potassium, 1:2000, and place the child on her back on a table or other hard surface in a good light. The thighs are to be flexed and the hips placed on a rubber cloth or Kelly pad draped into a pail on the floor. The labia majora are separated and the discharge washed away from the vulva by gentle sopping with a pledget of absorbent cotton. The vagina is irrigated with a soft-rubber catheter attached to a syringe (either bulb or fountain syringe will serve). The frequency of the irrigations is timed according to the amount of the discharge; if it is very profuse, two or three times a day, if less, once a day will be sufficient. In the chronic stages of the disease a solution of nitrate of silver, 1:500, may be substituted for the permanganate of potash solution; often, it is a good plan to alternate the two. A sterile pad held in place by a T bandage prevents the spread of infection.

An excellent posture in which to treat a child is the knee-breast position, as shown in Figure 106. The nurse should first place a pledget of cotton saturated with a ten per cent solution of cocain against the hymen; and after ten minutes the child is placed in the knee-breast position and a Kelly speculum (No. 10) is introduced. This can be done without rupture of the hymen. The vagina then balloons out so that all parts are exposed to view, and can be easily treated with a three to thirty per cent solution of silver nitrate (see Fig. 107). This

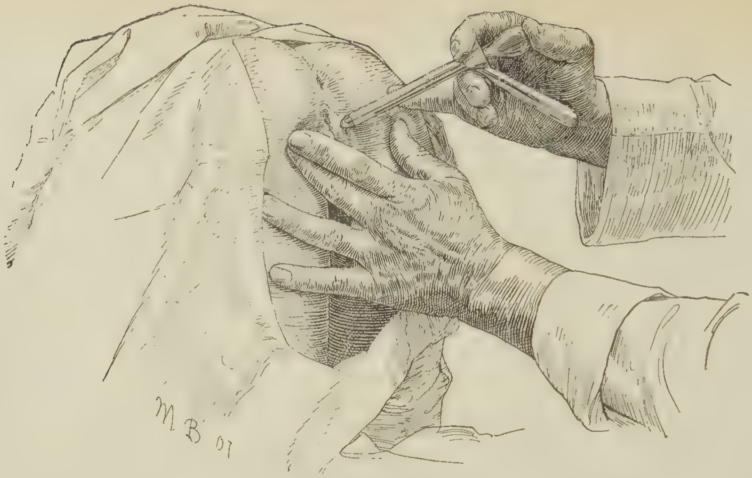

FIG. 107.—EXAMINATION OF A LITTLE CHILD WITH GONORRHEAL INFECTION OF THE VAGINA. The figure shows well the relative size of the body of the child compared with the instrument and the hands of the examiner. The speculum, which is only 1 cm. in diameter, can be introduced without injury to the hymen. In the knee-breast position the vagina distends to a maximum with air and can be easily treated, as shown in the next figure.

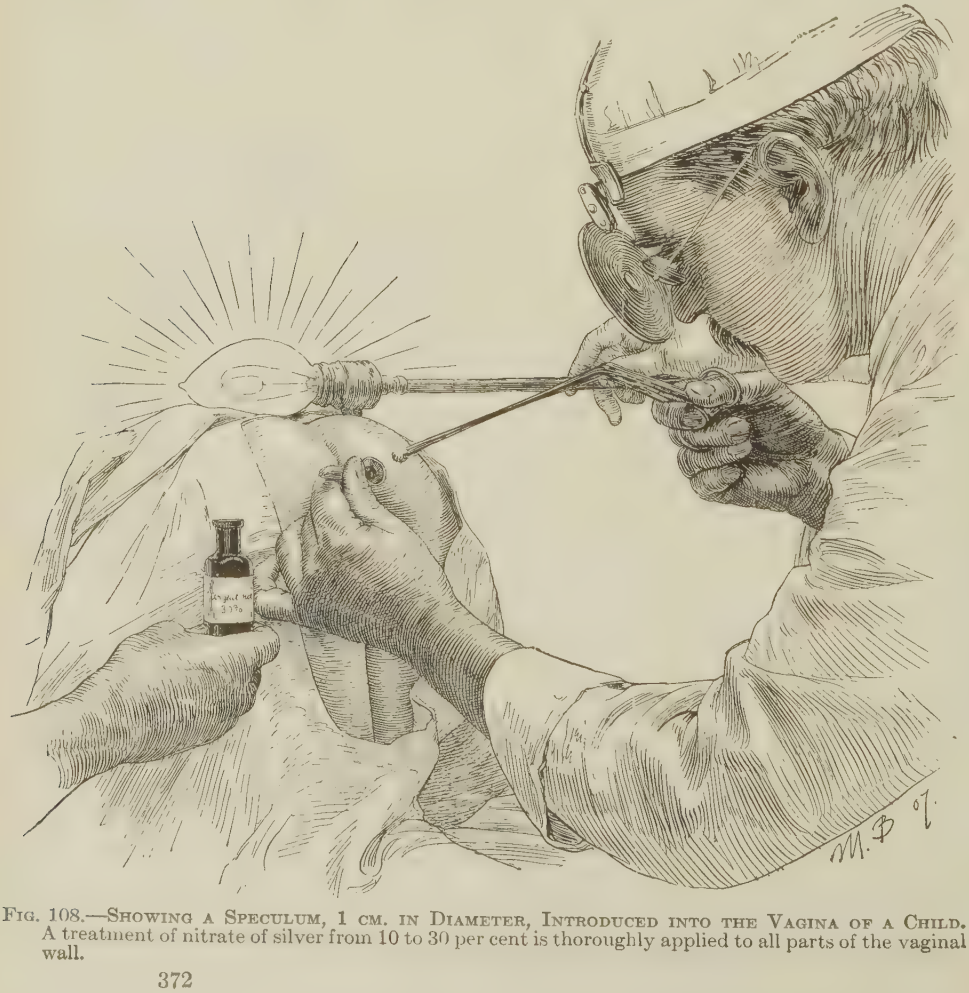

FIG. 108.—SHOWING A SPECULUM, 1 CM. IN DIAMETER, INTRODUCED INTO THE VAGINA OF A CHILD. A treatment of nitrate of silver from 10 to 30 per cent is thoroughly applied to all parts of the vaginal wall.

treatment is not painful or alarming, but it is necessary, of course, to gain the confidence of the child before applying it. If the urethra is also involved, a five per cent solution of nitrate of silver is injected by means of small glass syringes, either into the meatus urinarius or over the entire vestibule, if the child will not keep quiet. Chafing is best relieved by inunctions of zinc ointment, unless the case is complicated by syphilis, when the parts must be kept dry; for this purpose a dusting powder of equal parts of calomel, bismuth subnitrate, and boric acid is best. Constitutional treatment must be added, selected in accordance with the child's age. No home applications are advised, other than cleanliness of the parts and the use of the ointment or powder just mentioned, as the mother cannot be trusted to carry them out. The child must return for treatment, at first on alternate days, and afterwards with lengthening intervals as the case improves.

The complications of gonococcus infection, such as stricture of the urethra, cystitis, proctitis, ophthalmia, suppurative adenitis and arthritis, should be given appropriate treatment.

Whatever the treatment employed, it should be persisted in until the discharges are free from gonococci. The poor, half-cured victims of gonococcus infection are a menace to the community and a stain on the fair name of the medical profession.

CHAPTER XVII.

SYPHILIS.

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Syphilis is a chronic, contagious disease, intermittent in its manifestations, and indefinite in its duration. It is susceptible of being communicated from one individual to another by inoculative contact, direct or mediate, and is transmissible by inheritance.

THE CAUSAL AGENT OF SYPHILIS.

It has long been assumed that syphilis belonged to the class of microbian diseases, from analogies in its evolution and processes with other infectious diseases, the microbian origin of which has been demonstrated. Many investigators have claimed the discovery of a specific organism as the pathogenic agent. Since the discovery of the spirocheta pallida or treponema pallidum by Schaudinn and Hoffmann, in 1905, and the demonstration of its presence in the blood and lesions of syphilitics, it has been generally recognized as the specific germ of syphilis. At the present time, the etiological views of Klebs, Lustgarten, Van Niessen, Jullien and de Lisle, Max Joseph and Piorkowski have only a historical interest. The spirocheta pallida is a spiral organism, having the form of a corkscrew. The filament is a quarter to one micro-millimetre thick and four to twelve micro-millimetres long. The spirals are steep, the ends being sharp, and often having long thread flagella. The average number of spirals is from eight to twelve, but sometimes there are more. Giemsa proposed a special stain for the spirochete, and lately, April, 1907, he modified the stain, in such a manner that the organism can be demonstrated in smears in a few minutes.

The spirocheta pallida has been demonstrated in smears from practically all the manifestations of early syphilis, as chancre, papule, mucous patches, scaly patches, as well as in the blood, before, during and after the appearance of the early manifestations. In hereditary syphilis the spirochetae have been demonstrated as abundantly present in the fetus, in the placenta, and in sections from the internal organs, especially after the publication of Levaditti's method.

The spirocheta pallida is also found in smears from syphilitic lesions of inoculated apes. A doubt exists, however, as to the identity of the structure found in tissues with the real spirochete found in smears. It is claimed that the structure considered in tissues as a spirocheta pallida cannot be differentiated from other spirochetæ and from various tissue elements. While the spirocheta pallida has been generally accepted as the germ producing syphilis, yet the rigorous conditions demanded by modern science as essential to the acceptance of the view that a specific micro-organism is the cause of an infectious disease, have not, in its case, been complied with.

These conditions are, first, that the specific organism should be found in the diseased tissues, and in the products of no other disease. Second, that the organism should be susceptible of cultivation outside the human body. Third, that when a product of pure cultures is introduced into the same species from which it was derived, it should produce an identical disease. Up to the present time, no culture has been made of this organism, and the scientific proof of its pathogenic rôle has not been absolutely demonstrated. Yet the constant presence of the organism in the lesions of both acquired and hereditary syphilis, would seem to afford the strongest presumptive proof of its being the causative agent. In addition, the prompt disappearance of spirochetae from the tissues after the use of mercury, has been frequently observed. In the present state of our knowledge, then, we may conclude that the spirocheta pallida is probably the pathogenic agent of syphilis.

THE EVOLUTIONARY MODE OF SYPHILIS.

Syphilis is characterized by a certain definite order or regularity in its evolutionary course which, though not absolutely constant, is yet sufficiently uniform to admit of its division into three periods or stages, classified as the primary, secondary, and tertiary stages.

When the virus is introduced into the organism, there is no appreciable evidence of its action during a period of three to four weeks, on an average of twenty-six days; this has been termed the period of primary incubation. There then appears at the point of inoculation a circumscribed infiltration, termed the initial lesion or chancre, which for a time constitutes the sole sign of the disease. It is probable that the chancre serves as a focus for the multiplication of the infectious elements, from which they are diffused into the system through the medium of the lymph and blood channels.

The interval between the presence of the chancre and the appearance of visible manifestations of the disease upon the surface of the body, is termed the period of secondary incubation, which averages from six to eight weeks in duration. During the period of secondary incubation, there is an enlargement and induration of the nearest lymph glands and sometimes of the lymphatic channels leading thereto, with the development of various prodromal symptoms, chiefly of a subjective character.

Prominent among the prodromal symptoms which precede the outbreak of general syphilis is syphilitic fever, which may be accompanied by headache, pains in the back and limbs, and other signs of constitutional disturbance. The febrile reaction of syphilis has no well-defined characters which can be considered as specific. In many cases it is so slight as to escape observation. Syphilitic fever rarely possesses clinical importance. It usually subsides spontaneously with the appearance of the eruption. There are numerous other symptoms, of a subjective character, which may occur in the early stage of syphilis, such as pains in the muscles, bones, and so forth. In addition to the rheumatoid pains, headache, arthralgia, or osteocopic pains along the prominent parts of the bony skeleton, may mark the invasion of syphilis, although the osteocopic pains are more pronounced at a later stage. During this primary period there is an alteration in the constituents of the blood, characterized by an increase of the white corpuscles and albuminous constituents, and a diminution in the number of the red corpuscles.

The secondary stage of syphilis is marked by an outbreak of generalized and symmetrical eruptions upon the skin and mucous membranes. The eruptions vary in form, in extent, and in severity, while exhibiting certain specific features which stamp them as the peculiar product of syphilis. They are not continuously present, but come out in successive groups, periods of activity alternating with periods of intermittence, in which no active symptoms are present. Exceptionally, the eruption may be continuously present during a prolonged period.

Between the second and third stages of syphilis there is an intermediate period, of exceedingly variable duration, in which the disease remains latent or there are only occasional manifestations. This cessation of activity may be permanent, marking the definite end of the disease, or it may, after a more or less prolonged period of latency, be succeeded by tertiary manifestations.

The tertiary stage is characterized by lesions of the deeper structures, the subcutaneous tissues, the muscles, bones, and internal organs. The tertiary lesions of syphilis are limited and localized, rarely symmetrical, with a progressive and destructive tendency, producing more or less extensive loss of tissue. The duration of the tertiary stage is practically indefinite. The disease may be latent for months or years, and then manifest renewed activity accompanied by general symptoms, indicating the revival of the infective process.

While this division of syphilis into distinct stages has been found convenient for the purposes of description, it is to be understood that it is, to a certain extent, arbitrary, and devoid of scientific accuracy. There is no definite chronological limit which separates the second and third stages of syphilis. The distinction between the two is based rather upon the character of the pathological process than upon the age of the diathesis. Lesions of a secondary type may continue to recur long after the completion of the secondary stage, it may be five to ten years later; while, exceptionally, lesions which are pathologically of the tertiary type may be developed within the first few months of the disease. While there is no distinct line of demarcation between the two stages, it may be said in a general way that secondary eruptions are generalized, symmetrical in development, superficial in character, and show a tendency to spontaneous resolution. Tertiary lesions are non-symmetrical, deeper-seated, and do not exhibit the same tendency to spontaneous resolution. Instead of being reabsorbed, they tend to fibrous organization and fatty degeneration. During the secondary stage, the blood as well as the lesions contains the poison of syphilis, transmissible by contagion and by inheritance. When syphilis has passed into the tertiary stage, the disease was formerly considered no longer contagious or transmissible by inheritance, but since the discovery of the spirocheta pallida, and its demonstrated presence in gummata and other lesions of the tertiary stage, this view must be subject to modification.

VARIATIONS IN THE TYPE OF SYPHILIS.

Syphilis exhibits the widest variations in the type of the disease, as well as in the intensity, the multiplicity, and the succession of its manifestations, and in the severity and duration of their morbid activity. Many cases of syphilis are mild throughout their whole course, their essential benignity being expressed in the character of the surface manifestations, which impress the skin so lightly as to leave no trace. The entire manifestations may be confined to roseola, a slight papular eruption, and, possibly, implication of the hairy scalp, with slight alopecia, all of which may disappear in a few months, and the patient afterwards exhibit no symptoms. In some cases, mucous patches in the mouth constitute the sole manifestation of the disease. According to Fournier, the secondary symptoms may be so mild and evanescent as to entirely escape the patient's attention.

In other cases, the eruption is generalized and universal, with an almost constant succession of outbreaks. Before one eruption has disappeared, another is in process of development, so that, in one form or another, the eruption is almost constantly present. There is also a great diversity shown in the character of the morbid process. In some cases, the lesions are dry and atrophic throughout the course of the disease. In others, the lesions are moist, with a marked tendency to suppuration. The ulcerative form not infrequently takes on the characters of phagedena. In another type, confined almost exclusively to women, the surface manifestations may be slight or absent, while the nervous symptoms, in the shape of neuralgic pains, asthenia, hysteria, and so forth, are pronounced, and constitute the almost entire symptomatology of the secondary stage. In still another class of cases, which Fournier has denominated *syphilis secondare tardive*, lesions of the erythematous or papular type, often associated with mucous patches, may continue to recur as late as the eleventh or twelfth year of the disease.

IRREGULAR SYPHILIS.

A great many cases of syphilis are characterized by an unusual mode of evolution. This deviation from the typical mode impresses certain peculiarities upon the eruptive phenomena, and renders it impossible to classify them, as there is an intermingling or blending of secondary and tertiary manifestations, developed without order or regular sequence.

In the form known as "benign rapid syphilis," tubercles and gummata make their appearance before the complete disappearance of the papular or pustular eruptions, and there may be a simultaneous development of secondary and tertiary lesions during the entire course of the disease. The lesions, however, are essentially benign.

In malignant, precocious syphilis, the syphilitic process seems to skip over the superficial structures and to attack at once the deep tissues. Independent of the precocity of this process, the elements of malignancy are found in the violence of the irruption, the multiplicity of the lesions, their ulcerative and rapidly destructive character, and, very frequently, the presence of grave systemic complications. It was at one time supposed that the malignancy of syphilis was possibly due to a greater virulence of the infectious elements. It is now recognized that syphilis takes on a more malignant turn from circumstances connected with the general condition and nutrition of the patient. In other words, differences in the type of syphilis must be sought for, not in the quality or source of the syphilitic virus, but in the character of the soil in which it is implanted. Independent of the constitutional peculiarities of the patient, which may constitute an individual predisposition, there are numerous accidental conditions, of a general or local nature, which may modify the type of the disease. Among these etiological factors may be mentioned mental or bodily overstrain; the use of alcohol; tuberculosis, scrofulosis, and other debilitating conditions. In addition, local causes, traumatisms, various external irritants, the use of tobacco, etc., may aggravate local eruptions.

PARASYPHILIS.

The pathological significance of syphilis has been rendered much graver by the inclusion of a group of affections which are syphilitic in their nature and origin, but which do not respond to the effects of specific treatment. It is claimed that these morbid manifestations are not due to the direct action of the microbe, but result from the action of the syphilo-toxines, which impress the tissues in a manner peculiar to these products. It is asserted that the syphilo-toxines have a special and selective action upon the nerve tissue. In addition to functional disorders, such as neurasthenia, hysteria, tabes, general paralysis, epilepsy, leucoplasia-buccalis, and arterio-sclerosis, a large number of the dystrophies and degenerative changes peculiar to hereditary syphilis, are grouped among the parasyphilitic affections. It is also claimed that syphilis furnishes the etiologic soil for the development of many constitutional degenerative changes, leading to tuberculosis, diabetes, and possibly cancer.

REINFECTION IN ACQUIRED SYPHILIS.

It has always been held that one attack of syphilis protects against a second attack. A great number of authentic cases, however, have been recorded by different observers which would seem to establish beyond question the possibility of reinfection. Many such cases have been reported in which there was an interval of only a few years—in one case, two and a half years—between the first and second infection. In some cases the surface manifestations of a former attack were plainly evident and coincident with the eruptive phenomena of the second infection.

REINFECTION IN HEREDITARY SYPHILIS.

There is a general consensus of opinion among syphilographers that the subjects of hereditary syphilis gradually acquire a susceptibility to the contagion of syphilis, and are capable of contracting the disease from a new infection. In the hereditary form, it would appear that the immunity against infection gradually loses its force, and in many cases is extinguished at the age of puberty or else about the twenty-first year. There are many authentic cases on record of heredo-syphilitics who have acquired syphilis after the twenty-first year.

MORBID ANATOMY.

In the necessarily restricted limits of this article, an extended account of the pathology of syphilis cannot be entered into. It may be said in a general way that, histologically, syphilis belongs to the class of infectious granulomata. All the lesions of syphilis, irrespective of the stage of its evolution, possess the same histological characters. These consist essentially in an infiltration of round or embryonic cells in the connective tissue of the different organs, producing an inflammatory neoplasm or granuloma. The changes in the blood vessels may be intravascular, constituting endo-arteritis or endophlebitis; or they may be of perivascular origin. Even in the erythematous syphilide there is, in addition to the hyperemia, a slight cell infiltration permeating and surrounding the walls of the capillary vessels of the papillæ and corium. The spirocheta pallida is found in the walls of the blood vessels and especially abounds in the perivascular infiltration.

In the syphilitic papule, which represents the fundamental type of all specific lesions, the process affects principally the papillary body. By extension of the process to the deeper parts of the derma and subcutaneous tissues, the tubercle or gumma is produced. According as the cellular proliferation affects one or another element of the skin, there are differences in the situation, the volume, density, and conformation of the lesions, but they are all united by the lines of histological identity.

A special feature of syphilitic infiltration is its tendency to increase by peripheral extension, so that the borders of a lesion always represent the most recent cell accumulation. Another distinctive feature is that the inflammatory neoplasm or granuloma is incapable of organization and tends to disappear by resorption or purulent dissolution. In certain lesions of the gummatous type there is a tendency to sclerotic or fibrous alterations, with caseous or other forms of gummatous degeneration. In lesions of the secondary type there is a resorption of the infiltration without permanent changes in the vessels. In lesions of the tertiary type the involutionary changes are due to partial or complete obliteration of the vessels and resulting ischemia, with caseous degeneration, the necrotic changes usually beginning in the centre and extending to the periphery.

THE SOURCES AND MODES OF SYPHILITIC CONTAGION.

Sources of Contagion.—The sources of syphilis from which contagion is commonly acquired are the secretions of the chancre and of certain secondary lesions, more particularly mucous patches. The blood of syphilitics is inoculable, and consequently contagious, during the entire secondary stage. The lymph also is charged with the virulent principle of syphilis. It was formerly thought that the lymph conveyed the syphilitic contagion only when mixed with blood, but our knowledge of vaccinal syphilis shows that the perfectly clear lymph-vaccine vesicle from the arm of a syphilitic subject, without the slightest admixture of blood, is capable of conveying the disease. At what precise moment the blood becomes impregnated with the virulent principle, and at what moment it loses this virulent property, is not definitely known.

It was formerly supposed that none of the physiological secretions, as the milk, saliva, and semen of syphilitics is contagious. But recent developments in our knowledge of the disease has modified these conclusions. The possible contamination of the physiological secretions with the blood of glandular cells should not be overlooked. The tendency is towards the acceptance of the view that the semen may be contagious. Finger's experiments have shown that monkeys may be inoculated with syphilitic semen, with positive results. It is claimed that a positive result has been obtained by Voss, of St. Petersburg, who inoculated a girl with milk from a syphilitic woman. Levaditti, who has found the spirochete in the renal epithelium of syphilitic infants, suggests that even the urine may contain contagious elements. The saliva of the syphilitic may be the accidental vehicle of the virus, when mixed with the secretion of mucous patches in the mouth.

Modes of Contagion.—The virulent principle of syphilis is a fixed contagium, and may be conveyed from one individual to another by either direct or mediate contagion. While syphilis is commonly acquired through the direct inoculative contact of the genital parts in sexual intercourse, it may originate entirely independently of the sexual act. Syphilis may be acquired in the act of kissing from a mucous patch in the mouth. The nipple of a healthy nurse may be infected by the lips of a syphilitic infant, and a healthy infant may be infected from a syphilitic lesion on the breast of a nurse. As rarer examples of direct contagion, may be mentioned digital chancres of the surgeon or accoucheur from contact with syphilitic lesions, the bite of a syphilitic, the operation of skin-grafting, and so forth. Any object upon which the syphilitic virus has been accidentally deposited may serve as the medium of contagion, such as spoons, cups, forks, glasses, pipes, nursing bottles, children's toys, speaking tubes, sponges, surgical instruments, a tongue depressor or a catheter, the speculum, dental instruments, the razor, and objects used in industrial occupations, such as that of glass-blowers.

A healthy woman may serve as the conveyor of contagion without herself being infected, through the intermediary of syphilitic discharges deposited in the vagina by one individual from which the next comer is infected. A healthy wet nurse may contaminate a healthy infant after having given the breast to a syphilitic suckling. In vaccinating a number of persons, one of whom is syphilitic, the point of the lancet may be charged with his blood, and the next one in the series inoculated with syphilis.

PRIMARY SYPHILIS, THE CHANCRE AND BUBO.

Chancre.—Whatever may be the mode of contagion, the first effect of the virus is to develop at its point of entrance into the system a lesion of syphilitic character, designated as the chancre or initial lesion. The incubation period of the chancre is three or four weeks, on an average twenty-six days, although this period may be abbreviated or lengthened. The chancre first appears as a flat papule which increases in size and hardness; the surface gradually becomes eroded, and furnishes a slight secretion which dries into a scab or crust. Ulceration of the chancre is caused by secondary infection. In most cases it is superficial; but it may become deeper, producing a cup-shaped depression or excavated ulcer. In a few days the base of the chancre becomes indurated, and this induration, which constitutes the specific mark of the primary lesion, varies in density from a parchment-like thickening to a cartilaginous hardness. When grasped by the fingers, it feels like a hard, nodular body set into the skin. In many cases, however, the induration may be so slight as to be inappreciable. This is especially the case in chancres of the vulva. After the chancre has attained a certain development, it remains stationary for two or three weeks, and then heals, leaving a pigmented spot which gradually disappears. The induration often remains after the surface has healed, and may persist for several weeks or months. The total duration of the chancre, when uncomplicated, rarely exceeds four or five weeks.

Chancres vary in form, dimensions, extent, and depth of ulceration; the character of the induration present and the objective characters may also be modified by the intercurrent processes of inflammation, phagedena, gangrene, and so forth. The most common varieties are the superficial erosion; the ex-ulcerative chancre; and the excavated ulcer, or Hunterian chancre, the clinical difference between them depending upon the greater or less depth of the ulcerative action, and the more or less pronounced character of the induration.

The herpetiform chancre consists of a cluster of vesicles resembling herpes progenitalis. The vesicles, instead of drying up and disappearing, coalesce, and the base of the ulcer thus formed takes on the characteristic induration.

The mixed chancre presents the objective characters of both chancroid and chancre. If the virus of the chancre and chancroid have been inoculated at the same time, the lesion first presents the characters of the chancroid and later the base of the ulcer becomes specifically indurated. In the mixed chancre there is simply an association without combination of the two viruses. It is worthy of note that the simultaneous presence of the bacillus of Ducrey and the spirocheta pallida has been demonstrated in mixed chancre.

It was formerly thought that the chancre was invariably single, but more careful observation has shown that it is often multiple. Diversity in the form of the chancre is often determined by the anatomical characters of the tissues upon which it happens to develop. On the surface of the glans penis it often appears as a dry papule, the surface of which is scarcely or not at all eroded, and is covered with whitish scales. Situated in the balano-preputial furrow, it is more apt to be elevated, with a nodular induration. Chancre of the meatus may affect one or both lips of the urethra and extend into the canal. In this situation it is apt to be erosive, and may take on a phagedenic action. Chancre of the urethra or concealed chancre, while comparatively rare, is clinically important, since it is frequently overlooked, and its sero-sanious discharge may be mistaken for that of chronic gonorrhea.

Chancres in the female, from their situation upon parts concealed from observation, and their indolent and painless character, often pass unperceived by the patient. They most frequently occur on the labia majora, extremely rarely upon the vaginal walls, but not infrequently upon the cervix uteri. When situated upon the inner surface of the labia or upon surfaces in contact and kept moist by the natural secretion, they are frequently transformed into mucous patches or condylomata.

Multiple chancres are almost always due to the simultaneous inoculation of a number of rents and abrasions, but they may be produced by successive inoculation. Cases are reported in which chancres successively developed as late as from the fifteenth to the twenty-fifth day after the first.

Chancre redux, or relapsing chancre, may appear after the complete cicatrization of the first chancre, presenting all the characteristics of the primary lesion.

Extragenital Chancres.—The site of the chancre is determined altogether by the conditions of contact. While in the large majority of cases it is situated upon the genital parts, extragenital chancres are comparatively common. They have been found on almost every part of the body, except the soles of the feet; likewise every portion of the mucous surfaces accessible by contact may be the seat of infection, as the lips, tongue, tonsils, or the conjunctival, nasal, urethral, or anal mucous membranes. The three regions which may be regarded as centres of predilection are the perigenital, the mouth, and the breast, simply because these parts are most frequently brought into immediate contact with the infectious virus.

Labial Chancre.—Chancre of the lip is usually single, and occurs most frequently on the lower lip. Owing to the irritation to which the lip is subjected in taking food and other causes, chancre in this situation may develop into a hypertrophic form, simulating a malignant growth.

Chancre of the Tongue.—This is usually situated on the anterior third of the dorsal surface. It may occupy the side of the tongue, which frequently becomes ulcerated and fissured so that it may be mistaken for a beginning epithelioma.

Chancre of the Tonsil.—Chancre of the tonsil occurs much more frequently than was formerly supposed, as many such cases were not identified. It is usually attended by considerable redness, swelling and inflammatory exudation.

Nasal chancre is comparatively rare. The contagion may be effected by means of the fingers, instruments, penholders, and so forth. A large number of cases of nasal chancre have been caused by catheterization of the Eustachian tube by contaminated catheters.

Chancre of the eyelid, affecting either the ciliary border or the conjunctiva, has been observed. Contagion may be effected indirectly by the fingers, or by contaminated towels; or directly by coughing during the course of an examination of the throat of a person affected with secondary syphilis.

Chancre of the face is most often caused by kissing or by the use of infected shaving utensils. Occurring on the bearded portion of the face, it is frequently mistaken for ringworm, or even for epithelioma.

Chancres of the nipples most commonly occur from contamination through suckling a syphilitic infant. They are more apt to be multiple in this region than upon any other part of the body.

Digital chancres have a special interest for professional men, as they themselves are the most frequent sufferers from them. They are most commonly acquired by digital examination or manipulation in obstetrical, gynecological, or surgical work. In Fournier's statistics of forty-nine cases of digital chancre, thirty occurred in physicians. Their great frequency among professional men emphasizes the importance of using great circumspection in making vaginal examinations and in operations upon syphilitic subjects. They are most often contracted from mucous patches of the vulva or from mixed infections or concealed lesions in persons not known to be syphilitic. Many physicians called to a woman in labor, for example, are accustomed to make a digital examination without inspection of the genital parts, or without any knowledge of the condition of the patient's health. Cuts, abrasions, hang-nail, eczematous eruptions, or any break of the epidermis from whatever cause, may be a point of entry for the syphilitic virus.

Bubo.—Another phase of the primary stage of syphilis is marked by the indolent enlargement of the nearest lymph glands in the region of the chancre and sometimes the lymphatic vessels leading thereto, which may be traced in the form of thickened cords, constituting the so-called lymphangitis of syphilis. Induration of the lymphatic glands is the most constant and, from a diagnostic point, the most valuable sign of syphilitic infection. The process usually begins in the first or early in the second week after the appearance of the chancre. The glands in closest anatomical relation to the chancre, whatever its situation, are always the first involved. Usually one gland is first affected, and later a number of contiguous glands undergo the same process, forming a characteristic chain. The bubo of syphilis is firm, easily movable underneath the skin, not painful on pressure, and without inflammatory complication. The three specific marks of mobility, hardness, and indolence serve to differentiate syphilitic glands from any other morbid process.

Diagnosis of Chancre.—The diagnosis of the initial lesion of syphilis is often a matter of extreme difficulty, and is not possible within the first few days, before it has become the seat of induration. The discovery of the spirocheta pallida in the secretions or smear from the chancre promises to facilitate an early diagnosis, but it must be borne in mind that while the presence of this organism is decisive of syphilis, the failure to find it does not exclude the disease. The result of an examination may be negative, owing to imperfection in the technic of the process.

The three most important elements upon which the diagnosis of a chancre is based are the period of its incubation, induration of its base, and specific induration of the neighboring lymph glands. Each of these signs may, however, have a deceptive significance. The date of infection cannot always be determined, the induration may be inflammatory, and the glands may be sympathetically swollen. So many sources of error are possible that the most experienced physician cannot always pronounce positively upon the syphilitic character of a venereal sore until the appearance of general symptoms.

Herpes progenitalis may be confounded with chancre. Simple herpetic vesicles occur in clusters, they are more superficial, have a soft base, and disappear spontaneously after a comparatively short duration; moreover, they are multiple, while chancre is usually single. In herpetiform chancre, the contour of the lesion is more circular, the base becomes indurated, the border thickened and prominent, and the characteristic glandular complication invariably follows.

A furuncular lesion, especially when upon the female genitals, has been mistaken for chancre.

In the great majority of cases where a patient presents herself with a sore upon the genitals, the diagnosis lies between chancre and chancroid. The differential features are: the period of incubation; the single or multiple character of the sores; the depth of ulceration; and the peculiar punched-out ulcer, with its uneven, worm-eaten floor, undermined edges, and abundant purulent secretion of the chancroid, in contrast with the smooth surface and thin, sero-sanious discharge of the chancre. The induration of the chancre is sharply defined, while that of the chancroid is soft and shades off into the surrounding tissues. The bubo of chancre is almost invariably present, with enlarged glands several in number, hard, indolent, movable, and rarely suppurating. The bubo of chancroid occurs in only about one-third of the cases. It is usually single, inflamed, painful, and often suppurating. Confrontation, when practical, certainly affords a valuable indication, but its trustworthiness is impeached in all cases where promiscuous intercourse has been indulged in. In view of the frequent occurrence of mixed chancre, however strongly clinical probabilities point in favor of the chancroidal character of a venereal sore, the physician is not justified in positively assuring his patient that it may not be followed by constitutional accidents.

The diagnosis of extragenital chancre is rarely made in its developmental stage, partly because the suspicion of the physician or patient of its possible venereal nature is not aroused. The chief diagnostic features are, the prolonged persistence of the lesion during several weeks without undergoing marked changes, the induration at its base, and the enlargement of the nearest lymph glands.

Digital chancres are especially difficult of diagnosis, as they often present only a brownish or dusky-red infiltration, with a slightly indurated base with no characteristic features.

Prognosis of Chancre.—The prognosis of the chancre, viewed in its aspect of a local lesion, is always favorable. It is essentially self-limited, with a tendency to spontaneous cure, and healing generally without a cicatrix. When complicated with phagedena, gangrene, phimosis, or other inflammatory conditions, the local consequences may be more serious.

The prognostic significance of extragenital chancres is more unfavorable, as they are subject to numerous sources of irritation. Chancres of the lip, tongue, and pharynx are exposed to multitudinous causes of irritation from contact with food, spices, hot liquid, and so forth, while the constant movement of the parts in talking and swallowing interferes with the rest necessary to permit of healing. Chancres of the tonsil, especially, have a bad prognosis, as the structure of the tonsil is favorable to syphilitic infiltration and its crypts constitute favorable breeding places for pyogenic cocci. Not infrequently, chancres of the tonsil are accompanied with malaise, fever, and other signs of constitutional disturbance, due doubtless to secondary infection. Chancres of the fingers, especially those of the panaris type, are proverbially painful, and apt to be attended with severe glandular complications. The pain is readily explicable from the character of the tissues involved, the structures being dense and resisting and the nail-bed endowed with exquisite sensibility. The digital chancre is subject to numberless causes of irritation, from pressure, painful contact, and so forth, besides being exposed to secondary infection from pyogenic germs. The septic process thus set up is not infrequently attended with severe lymphangitis, pyemia, and other complications.

Treatment.—Since the chancre has a tendency to heal spontaneously, expectant treatment alone is necessary in the majority of cases. Rest, cleanliness, and an aseptic dressing are usually the only measures indicated. The surface may be dusted with calomel, zinc oxide, or xeroform. When there is a tendency to suppurative action, mild astringents and the use of a black wash may be employed. In inflammatory conditions, with a tendency to gangrene, solutions of permanganate of potash and a mild lotion of chloride of zinc, or wet boracic acid dressings, are indicated.

Chancres in particular situations, as in the meatus, are best treated with bougies of iodoform or tents smeared with mercurial ointment. Cases of concealed chancre, with phimosis, require irrigations through a small flat-nozzled syringe, inserted under the prepuce. Weak solutions of bichloride of mercury or silver nitrate may be employed. The voluminous indurations, which sometimes remain after cicatrization, undergo spontaneous resorption, but their involution may be hastened by the internal medication of mercury. The induration of the lymphatic ganglia rarely requires local treatment. When they become painful from peri-glandular inflammation, the use of mercurial or belladonna ointment, to induce resolution, is of service.

Abortive Treatment.—The question of the possibility of destroying the syphilitic virus at its point of entrance, and thus preventing infection of the general system, has been settled by the test of clinical experience. Abortive treatment by excision or destructive cauterization of the chancre is condemned by its clinical results. Brandes excised a chancre ten hours after its appearance, without preventing secondary syphilis. Niesser stated that in a macaque, or monkey, in which the inoculated part was excised eight hours after inoculation, syphilis developed in the normal way. Experiments by Metchnikoff and Roux determined that the period of localization of the virus does not exceed twenty-four hours.

SECONDARY SYPHILIS. THE SYPHILIDES.

The eruptions upon the skin and mucous membranes produced by syphilis are termed syphilides. While the macule, the papule, the pustule, and the tubercle represent the four fundamental types of syphilitic lesion, the combination or blending together of elementary forms has led to the necessity of using compound names, such as erythemo-papular, papulo-pustular, papulo-squamous, pustulo-crustaceous, tuberculo-ulcerous, in order to define their anatomical characters with greater accuracy. Some writers recognize the vesicular or bullous syphilide, but the vesicular element is usually accidental, due to the intensity of the inflammatory process, and of limited duration. The bullous syphilide cannot be considered a distinct type, since lesions which begin as bullæ rapidly undergo a purulent transformation; it is an exceedingly rare manifestation of acquired syphilis, found almost exclusively in the hereditary form.

General Characteristics.—Although syphilitic skin diseases consist of the same eruptive elements as are met with in other forms of cutaneous disease, yet they are impressed with certain peculiarities which reveal more or less distinctly their specific origin, and often enable the skilled physician to recognize their nature at a glance. These peculiarities are associated with their mode of evolution, their polymorphism, color, configuration, grouping, the character of the scales, crusts, cicatrices, the absence of pain or other subjective symptoms. The distinctive features are especially manifest in their raw-ham or coppery color; their symmetrical distribution in secondary syphilis; and their tendency to form circles or segments, giving rise to the characteristic crescentic, serpiginous, and horseshoe shapes of the ulcerative lesions.

Varieties.—The early eruptions of syphilis, like the exanthemata of other blood poisons, may be distributed over the whole surface of the body, yet each eruptive form manifests a predilection for certain regions: the erythematous syphilide for the chest, trunk, and flexor surfaces; the papular syphilide for the face, brow, margin of hairy scalp, back of neck, head, and limbs; the squamous syphilide for the palmar and plantar surfaces; the pustular syphilide for the parts covered with hair; the ecthymatous eruptions most commonly affect the limbs, and principally the lower; tubercular lesions are found everywhere; moist papules have a predilection for the natural orifices, as the commissure of the lips, the entrance to the nares, the genital and anal folds, or any place in which the skin is thin and delicate and exposed to moisture and friction.

The apruriginous character of the syphilitic eruption constitutes a valuable differential sign. The patient may be unconscious of its existence, so far as subjective sensations are concerned.

The Erythematous Syphilide, variously designated as the macular syphilide, roseola syphilitica, etc., is the earliest as well as one of the commonest cutaneous manifestations of syphilis, appearing, usually, from seven to eight weeks after the chancre. It probably occurs in nearly all cases, but from the absence of subjective sensations and the peculiarity of its localization upon parts habitually covered by the clothing, it may entirely escape observation. The eruption first appears on the sides of the chest and abdomen, less commonly on the limbs, and rarely on the face. It consists of rounded or oval spots, the color being at first bright red or pink, and disappearing upon pressure; later it deepens into a yellowish-brown pigmentation, unaffected by pressure. The spots vary in number and degree of coloration; sometimes they are few and scattered, at other times thickly disseminated, like the macules of measles. They may be so pale as to be hardly perceptible, giving the skin a faintly marbled aspect; at other times they are vividly prominent.

The Maculo-papular Syphilide is an exaggerated or advanced development of the macular variety. The eruptive spots are slightly elevated, situated upon an erythematous base, and sometimes covered with fine desquamating scales. Occasionally, one or more larger papules make their appearance in the centre of the erythematous patch. After its complete involution, syphilitic roseola may recur a number of times during the first or even the second year of the disease. With each recurrence the spots are fewer in number, as well as larger, and paler in appearance.

Diagnosis.—Syphilitic roseola may be differentiated from simple roseola by the absence of febrile symptoms and itching, and by the coincidence of other signs of syphilis, such as the history of a chancre and the presence of enlarged glands.

The Macular Syphilide often resembles closely the eruption of measles. The characteristic development of the latter upon the forehead and back of the ears, the suffusion of the eyes, and the catarrhal symptoms are sufficient to make the diagnosis. A copaibal rash is sometimes mistaken for syphilitic roseola, but in the former the spots are redder, more rounded and discrete, and situated especially about the joints and on the backs of the hands. They are also characterized by an intense burning and itching. In its declining stage syphilitic roseola may be mistaken for pityriasis versicolor. The latter affection is easily differentiated by its yellowish-brown color, and the fact that the pigmentation may be removed by scraping or washing, while the syphilitic spots are unaffected by these means. Pityriasis rosea has also been mistaken for syphilitic roseola. The spots of the former are the seat of active desquamation, while the latter never desquamate. Erythema multiforme may be distinguished from syphilitic roseola as the eruption is more discrete, purplish in color, and chiefly affects the wrists, ankles, and limbs.

The Pigmentary Syphilide.—This comparatively rare manifestation of syphilis, which is also known as leucoderma syphiliticum, may occur in the early secondary stage or as late as the third year. It is much more common in women than in men. Its favorite, though not exclusive seat, is the sides of the neck, sometimes the back of the neck and shoulders. It very rarely occurs on the face or extremities. It consists of irregularly rounded circles or islets, of a brownish color, isolated or confluent, not elevated above the surface, and not scaly. The true character of the pigmentary syphilide, and its relation to the syphilitic process, has not been definitely determined. It is probably due to some localized abnormality in the distribution of pigment matter, producing a loss of pigment in spots and a hyperchromia of the intermacular and surrounding spaces. The duration of this syphilide is usually prolonged. It is apparently uninfluenced by treatment.

While the nature and mode of production of the pigmentary syphilide is somewhat obscure, its presence is regarded as pathognomonic of syphilis. It must be distinguished from uterine chloasma, which rarely affects the neck; from Addison's disease, in which the pigmentation is more diffused; from vitiligo, in which the leucoderma is more pronounced, and in which there is an absence of hyperchromia which characterizes the pigmentary syphilide.

The Papular Syphilide.—The papular syphilide in the extent of its distribution, the variety of its lesions, its prolonged continuance, and its pathological significance, is the most important of the group of secondary eruptions. It usually makes its appearance from the third to the fourth month. It may immediately succeed, or develop coincidently with, the erythematous form, but its appearance may be postponed by early specific treatment. Recurring crops of the eruption may appear during the entire secondary stage, and even in the early tertiary stage; it often merges by insensible gradations into the tubercular form. The eruption consists of distinctly circumscribed, solid elevations, from the size of a pin-head to that of a lentil, and sometimes considerably larger, resting upon an erythematous base. In form they may be either prominent or flat. When the papule attains its full development, it is covered by a dry, shining skin, exceedingly tense over the surface from the cellular infiltration; this, upon desquamating, forms a sort of collar of broken, partly detached epidermis around the periphery. The papules undergo involution, and the color, which at first is bright red, changes to a purplish-red, and then gradually fades out. According to their form, volume, and other objective characters, papular lesions have been classified as follows: the lenticular papule, the miliary papule, the squamous papule, and the moist papule. This division does not imply four distinct varieties, but indicates the varying form which the papular eruption assumes, according to its location and the mode of its evolution.

The Lenticular Syphilide.—This eruptive form is the most common and characteristic of the secondary manifestations of syphilis. The papules are rounded, oval, and slightly elevated, the lesion gaining in superficial extent what it loses in height. The surface is at first smooth and flattened; later it presents a depression in its centre, the desquamating epidermis forming a fringe. In certain localities the papule may attain the dimensions of a twenty-five or fifty-cent piece, and is then known as the nummular syphilide. The larger lesions present a firm, well-defined border, with a smooth, plain surface. Sometimes the margins are elevated with a shallow depression in the centre, which gives them an umbilicated appearance. The development of these papules upon the brow and margins of the hairy scalp constitute a peculiar feature, known as the "corona veneris."

The Miliary Papular Syphilide or Lichenoid Syphilide.—The small or miliary syphilide is perhaps the most infrequent variety of the papular form of eruption, representing a proportion of less than ten per cent. It consists essentially of an infiltration of the follicular structures. The infiltration is confined to the apex, and does not involve the base of the papule. The form is that of minute, conical or pointed projections, the size of a pin-head or millet-seed, grouped in circles or segments of circles, each group consisting of from ten to forty lesions. These efflorescent patches are distributed over large surfaces, principally invading the trunk and limbs, back of shoulders, and sternal region. In another variety of the miliary syphilide, the papules are larger, more rounded, less numerous, and not so characteristically grouped. This syphilide is characterized by being exceedingly persistent and rebellious to treatment.

As the name implies, the small papular syphilide or lichen syphiliticus presents certain resemblances to lichen planus. In lichen planus the papules are smooth, shiny, flat, and often have a central depression, giving them a slightly umbilicated appearance; they have a tendency to group in placards. It is, moreover, quite pruriginous. When the miliary papules are closely aggregated and desquamate abundantly, they bear a resemblance to a diffused patch of psoriasis. Minute examination shows that the syphilitic papules are not confluent, but simply coherent at their bases, while the psoriatic papules are coalescent and the surface of the psoriatic patch is more or less uniformly covered with large scales.

The Papulo-squamous Syphilide.—An important modification of the papular type of syphilis is characterized by a marked proliferation of the epidermal elements, which collect on the surface in the form of dry scales, more or less adherent, simulating the appearance of psoriasis. The mildest manifestations of this squamous process are in the form of minute furfuraceous or branny scales, termed syphilitic pityriasis. A more pronounced development of the scale is often seen in the larger and more prominent lesions of the late secondary stage. A single papule may enlarge, or several papules may coalesce, forming diffuse patches, usually crescentic or circinate in form, covered with dry, adherent scales, and giving a most deceptive resemblance to patches of psoriasis.

In making a diagnosis between the two it must be remembered that the scales of a syphilitic lesion are thicker than those of psoriasis; they are usually of a dirty-white color, and lack the glistening, silvery-white appearance and stratified formation of psoriatic scales. When the scales are detached from a syphilitic papule, the subjacent infiltration appears deeper, elevated at the border, and with a reddish-brown centre. When the psoriatic patch is denuded of scales, there is presented a hyperemic surface, with a number of bleeding points.

Circinate Papular Syphilide in certain locations, when covered with yellowish, greasy epithelial scales, may present a strong resemblance to the annular patches of seborrhea. They are differentiated rather by their history or the presence of other symptoms of syphilis than by differences in the objective characters of the lesions.

The Palmar and Plantar Syphilides.—Syphilitic papules upon the palms and soles present certain modifications in form and aspect, due to the thickness of the epidermis of these regions. They derive a special clinical interest and importance from the fact that they bear such a close resemblance to the lesions of psoriasis and eczema of the palms and soles that it is difficult to differentiate them. They may develop in the first, second, or third year of syphilis, or their chronological limit may be extended to five or ten years, or even longer. In the earlier period they are usually bilateral, later they are more often unilateral. The later lesions often appear in the form of flat, livid spots, the surface of which desquamates and comes off in scales. The papules may coalesce and form infiltrated patches, usually crescentic or circinate in form, with a tendency to heal in the centre while advancing at the periphery. In the natural furrows of the palms and fingers deep creases or fissures are apt to occur, occasioning much pain and inconvenience, which is aggravated by their exposure to pressure, friction, and other causes of irritation.

The designation of these syphilides as palmar and plantar psoriasis would indicate a marked resemblance or identity of the objective characters of the lesions. Psoriasis is rarely, if ever, limited to these regions, but when found there is always associated with the development of the disease upon other parts of the body. A psoriasiform eruption, limited to the palms, is almost pathognomonic of syphilis. The differentiation from eczema is exceedingly difficult and often impossible. Syphilis generally begins in the middle of the palm and spreads centrifugally. The coppery wall of infiltration which marks its advancing border is irregular and scalloped in outline; its outer edge is sharply defined and terminates abruptly. Eczema, on the contrary, usually begins on the wrist or the root of the palm or fingers, or upon the dorsum of the hand, where syphilis is rarely found. Eczematous infiltration is more uniform and evenly distributed and the infiltration does not terminate so abruptly. Eczema is further distinguished by severe itching, which is absent in syphilis.

The Moist Papular Syphilide.—This type of eruption is found where the skin is delicate and moist, or in the natural creases, where contiguous surfaces come in contact. The epidermis becomes macerated and eroded, and there is a transformation of the dry into the moist papule. Moist, cutaneous papules may occur upon the genital or anal regions, on the breast of the female, the nates, and groin, between the toes, or wherever the skin is fine and humid. They are laden with the poison of syphilis and are ultra contagious. The spirocheta pallida is found, often abundantly, in the scrapings from these lesions. The condyloma latum is especially common in the vulvar region, and also occurs in men on the scrotum and perineum. The papules often fuse together and form large placards which may extend to the perigenital parts, often forming large cauliflower growths, with fissures and ulcerations. The spirocheta pallida is found abundantly in these condylomatous patches. On the mucous surface of the vulva the moist syphilide is seen in the form of erosions and mucous patches. They possess a special importance from the fact that they are the most frequent sources of the syphilitic contagion.

Condylomata lata are apt to be confounded with the vegetations of gonorrheal, chancroidal, and other irritating conditions of a non-syphilitic nature. The acuminate vegetations from chancroid or gonorrhea are more apt to be distinctly pedunculate, with a branched dendritic character of growth, and a more distinctly warty surface.

The Pustular Syphilide.—This type is more properly termed papulo-pustular, as it represents an advanced stage of the papule. In some cases pustulation occurs so rapidly that the primary papular form is not distinguishable. Exceptionally, the eruption may begin as distinct pustules. The so-called vesicular syphilide may also be grouped under this division as the vesicular element is rapidly transformed into pus. While the macular and papular eruptions usually precede the pustular syphilide, the latter may exceptionally occur as the initial eruption. The early presence of the pustular eruption indicates a bad type of syphilis, since it is an expression of a depraved state of the patient's constitution. The more superficial forms are ranged among the secondary manifestations. The deeper and more destructive forms of a pustulo-ulcerous character may develop coincidently with distinctively tertiary lesions. Malignant syphilis is usually manifested in precociously developed pustular lesions.

The following varieties of the pustular syphilide may be distinguished: the acne-form, variola-form, impetigo-form, and ecthyma-form.

In the acne-form syphilide the follicular structures, sebaceous glands and hair follicles are chiefly affected. Suppuration takes place within the follicles. The lesions are of various sizes, from that of a pin-head to larger, situated upon a reddened infiltrated base. Upon the scalp this syphilide frequently constitutes one of the earliest of the secondary manifestations, but from its location it is frequently overlooked. It may occur upon the forehead, back of neck, shoulders, buttocks, and outer aspects of the limbs.

The acne-form syphilide bears a close resemblance to acne vulgaris. It may be distinguished by the smaller, more uniform size of the papules, their dark, coppery color, and the absence of comedones; the coexistence of other signs of syphilis is also a differentiating feature.

The variola-form syphilide occurs in the form of dull-red, infiltrated spots, the epidermis over which becomes distended, with a serous or sero-purulent fluid. In a few days they become flattened and depressed in the centre, with the formation of an adherent crust, formed by the drying of the purulent elements. It especially affects the face, trunk, and limbs.

This syphiloderm has an additional clinical importance from its resemblance to varicella or variola. The resemblance is heightened by the frequent occurrence of more or less febrile disturbance. From varicella it may be distinguished by the absence of itching and other signs of inflammatory disturbance of the skin, and by its more chronic and sluggish development. The changes in varicella are more rapid. In addition, varicella is essentially a disease of childhood, while syphilis is more common in adult life.

From variola the distinction is not so readily made. Hutchinson says: "The simulation of the variolous eruption by syphilis is the most marked example of 'syphilitic imitation.'" The differential points are: the history of the case, the more chronic evolution and course of the syphilitic eruption, the brownish, coppery color of the lesions, and the absence of the intense prodromal symptoms which usher in an attack of small-pox.

The impetigo-form syphilide is a flat, superficial pustule, the exudation from which quickly dries into a greenish-brown adherent crust which, upon its removal, leaves an uneven surface. Not infrequently the crustaceous pustules run together and form patches, constituting the confluent impetiginous syphilide. In the variety known as impetigo rodens, the ulcerative process, instead of being limited to the superficial layers, involves the entire thickness of the skin. This form presents a great similarity to the ulcero-crustaceous lesions of the tertiary stage of syphilis.

The impetigo-form syphilide may be mistaken for impetigo vulgaris, as the objective characters of the lesions are very similar. In impetigo vulgaris the invasion of the eruption is more acute, and is attended by more or less heat and itching of the skin. The course of the lesions is much more rapid and the inflammatory areola disappears when the crust forms. From impetiginous eczema, this syphilide may be distinguished by the more sharply defined periphery of the lesion, the character of the crusts, and the absence of subjective symptoms. In eczema the discharge is thinner, forming yellowish, flaky scales, and is usually attended with intense subjective sensations.

The ecthyma-form syphilide, sometimes designated as the large pustular syphilide, may be described as a slight elevation of the epidermis, containing a turbid, cloudy fluid, which quickly desiccates, forming a dark-brown scab, beneath which ulceration takes place more or less deeply. The superficial variety does not differ essentially from the impetigo-form, except in the larger size of the pustules and its predilection for the lower extremities, where it is habitually seated. In the deep variety, the ulcerations are more extensive and profound, often assuming a serpiginous form; the edges of the ulcer are punched out or excavated; and frequently the crust does not completely cover the ulcer, but is surrounded by a ring of ulceration. The suppuration of ecthyma is usually profuse and of long duration. After healing, there remains a brownish cicatrix, which for a long time is surrounded by a coppery areola. The ecthyma-form syphilide is usually a late manifestation, except in malignant syphilis where it appears precociously. Not infrequently, by the confluence of lesions of this type, large surfaces of ulceration are formed, accompanied by fever of a hectic character and other severe systemic symptoms.

This syphilide may be confounded with ecthyma vulgaris. The lesions of the latter are more furuncular in character, as well as more painful, while the suppuration is more superficial, with less tendency to form a crust. Varicose ulcers of the leg have also been mistaken for ecthymatous ulcers.

Rupia.—This is one of the most typical lesions of syphilis; the presence of characteristic rupial crusts may be regarded as pathognomonic. The term is applied to the accumulation of dirty-brown, distinctly laminated, conical-shaped crusts, covering a flat, superficial, ulcerated surface. The crust is formed by the drying of the pustular contents, and as the ulcerative process extends at the periphery, the crust is thickened by the addition of successive layers from beneath, each layer giving it a broader base while, at the same time, increasing its height. In this way the crust often assumes a conical or oyster-shell shape, and may rise from half an inch to an inch above the surface. Rupia may be ranked as a late secondary manifestation. In cachectic or debilitated persons, it may develop within the first six months, in which case it is usually associated with other evidences of precocious syphilis.

TERTIARY SYPHILIS.

Varieties.—The Gummatous Syphilide.—Under this heading may also be grouped the tubercular syphilide. The tubercle is a small gumma developed in the deeper layers of the skin. It forms a small nodule, varying in size from a pea to a filbert or larger. The tubercles may be either localized or disseminated, discrete, or confluent. There are two varieties, the dry or atrophic and the ulcerative. In the former, resorption occurs without ulceration. In the latter disintegration and ulceration rapidly take place.

The dry or atrophic variety may develop comparatively early. It may be confined to the face, shoulders, or back of arms, or it may be disseminated over the entire surface of the body. When tubercles are grouped upon the face and brow, they give rise to the appearance known as "leontiasis."

The ulcerous variety may be developed at any time, from the third to the fifteenth or twentieth year of the disease or even later. It does not differ essentially in form and volume from the preceding, but the tumors undergo a process of softening and breaking-down, becoming converted into ulcers which are deeply excavated and crateriform, with adherent edges, and an infiltrated border. The cavity left by this loss of substance tends to enlarge, healing at one point, extending in another, and often assuming a horseshoe or kidney shape.

Subcutaneous gummata are developed in the subcutaneous or submucous tissues, and in the muscles, bones, and internal organs. The nodules or tumors vary in size; when deep-seated or flattened they may cause no projection above the surface. They are at first freely movable, indolent, and insensitive to pressure. Later on, they undergo a caseous degeneration, become adherent to the skin and soften in the centre, so that the morbid products, consisting of a honey-like material, are evacuated. The ulcer thus left is a circumscribed deep excavation, with thickened edges and uneven floor, covered with the débris of disintegrated tissues.

The serpiginous syphilides may have their origin in pustulo-crustaceous, tubercular, or gummatous lesions. The ulceration, at first circular, may become reniform or gyrate, spreading over large tracts of skin. Its extension is determined by the course of the infiltration, which advances at one portion of the circumference, while cicatrization occurs at another. In the neighborhood of joints or of the natural orifices, the cicatricial contraction may result in loss of motion or stenosis.

The Vegetating Syphilide.—This does not constitute a distinct type. The tendency of lesions of the papular type to assume a condylomatous character under the influence of various local causes of irritation has already been referred to in connection with the flat condylomata. These papillomatous proliferations are determined by a hyperplasia of the papillæ which become elongated and prominent, giving the vegetations a mammillated or verrucose aspect; they may appear upon any of the ulcerative lesions of syphilis. The vegetating syphilide has a predilection for regions of the body provided with hairs, as the axillary folds, the genital regions, and the anal region. It is also found along the naso-jugal and naso-labial folds. The vegetations appear as irregular, round protuberances, of uneven size and elevation, and secreting a puriform fluid, which concretes into thin, yellowish crusts. The removal of the crusts reveals a red, rugous surface, made up of villous or flesh-like excrescences.

Diagnosis.—A tubercular syphilide may present a marked resemblance to lupus vulgaris, especially when it is localized in regions for which lupus shows a predilection. The most characteristic feature is found in the peripheral enlargement by the development of new lesions, and their tendency to a serpiginous mode of advance. The tubercles of lupus are pinkish, translucent, or of an apple-jelly color, and more irregular in outline. The lupus process is, moreover, much slower in evolution than syphilis. Lupus generally appears in early life, before puberty, while acquired syphilis is essentially a disease of adult life. Notwithstanding these points of differentiation, it is often difficult to decide whether we have to deal with a lupus vulgaris or a tubercular syphilide, especially when the lesion is situated in the region of the nose. Both may occasion considerable destruction of tissue and consequent deformity. In lupus, however, the ulcerative process is more apt to destroy the alæ and the tip and cartilaginous septum, but it does not attack the bony part of the nose. Syphilitic ulceration often begins in the bony structures and invades the superficial parts secondarily.

Epitheliomatous ulcers of the nose and face may be mistaken for the tuberculo-ulcerous syphilide. The hard, everted border of epithelioma, the granulating, fungous character of the sore, and its limitation, as a rule, to a single lesion, together with the glandular enlargements, the accompanying cachexia, and the age at which it is more likely to occur, will serve for purposes of differentiation.

Leprosy.—The tubercular syphilide bears a most deceptive resemblance to leprosy, especially when the lesions are hypertrophied and situated upon the brow and the lobes of the ears. The leprous neoplasms are softer to the touch and larger in volume than the syphilitic; they occur upon an infiltrated base, with edema of the skin and ganglionic enlargements. Anesthesia is often present in a patch of leprous tubercles or its immediate neighborhood, but absent in syphilis. At a more advanced stage of leprous leontiasis its features are so characteristic as to admit of no mistake.

Ulcerative gummata may also be mistaken for varicose ulcer, but the presence of varicose veins, and their more frequent occurrence in the lower third of the ankle, while the gummatous ulcer has a special predilection for the upper and middle third of the leg, should serve as differential points.

AFFECTIONS OF THE APPENDAGES OF THE SKIN.

Syphilis of the Hair.—Loss of hair is one of the most common of the secondary manifestations of syphilis. It often occurs in connection with the syphilitic fever which precedes the earlier eruptions. It may be limited to the hairy scalp or it may affect the hairy growth of the entire body. Alopecia most often occurs without visible changes in the scalp, but during the secondary stage a variety of seborrhea of the scalp often develops, differing in many features from ordinary seborrhea. Instead of increased secretion, with desquamation, there is a diffused infiltration of the papillary layer and the hair follicles. Saboraud classifies syphilitic alopecia as one of the infectious alopecias due to a toxine, causing atrophy of the hair papillæ and death of the hair.

In syphilitic alopecia there may be diffuse thinning of the hair of the scalp, or it may occur in patches which coalesce, forming polycyclic areas, which are quite characteristic. While usually limited to the hairy scalp, it may affect the eyebrows and eyelashes, and, more rarely, the hair of the axillæ and pudenda. The loss of the hair is not permanent, except when it continues to recur in connection with relapsing cutaneous manifestations. The later pustular and ulcerative lesions, involving the cutis in its entire thickness, destroy the hair follicles, leaving permanent bald spots upon the scalp, beard, or eyebrows.

Syphilis of the Nails.—The nail structures are affected by syphilis by processes which may affect both the nail and the matrix. In syphilitic onychia the alterations in the nails are usually the result of nutritive changes. They lose their brilliancy, become cracked, and friable, while the edges of the nail are broken, terminating in an irregular or jagged margin. Another variety of onychia is characterized by hypertrophy of the nail substance, the nail sometimes assuming a thickness of three or four times its normal size.

In paronychia, the morbid process usually begins as a papule developed under the nail, or in the ungual fold corresponding to the lunula, or else along its lateral border, with more or less swelling of the bed of the nail. This lesion may ulcerate and give rise to exuberant granulations which crowd the nail from its bed, resulting in its partial or complete loss. The new nail, ultimately regenerated, is apt to be misshapen or distorted. If the matrix be entirely destroyed, regeneration of the nail is not possible, and its bed is occupied by a rough, amorphous, horny substance.

SYPHILIS OF THE ALIMENTARY SYSTEM.

The Oro-pharyngeal Cavity.—Syphilis produces lesions of the buccal mucous membranes, analogous to those of the skin. They are modified in their forms and processes by the anatomical peculiarities of the soil upon which they develop.

Erythema of the mucous membrane of the mouth and throat often develops coincidently with or precedes the cutaneous eruption. It consists of a diffused redness, which may resemble catarrhal angina, and which is usually most marked upon the arches of the palate and tonsils, or the posterior wall of the pharynx. The tonsils are often red and swollen.

The mucous patch is the exclusive product of syphilis, and is the most common and characteristic of the secondary symptoms. It derives an additional importance from the fact that it is the most common and active source of syphilitic contagion. The mucous patch is a papule occurring upon the mucous membrane, usually superficial in character and of short duration, but reappearing with surprising facility. Its tendency is to recur repeatedly during the first two years, sometimes as late as the fourth or fifth year of the disease and even later. The typical lesion is a flat or slightly raised patch, of a cloudy, grayish-white color, formed by the thickening of the epithelium over a reddened infiltrated surface. Owing to the warmth and moisture of the parts, the epithelium becomes sodden and eroded. The patch may be single, or it may cover a large surface formed by the confluence of patches.

Upon the buccal mucous membrane and arches of the palate, the patches present a white opaline appearance, as if the membrane had been touched with a crayon of silver nitrate. At the tip and sides of the tongue, they are not rounded in outline, but are more apt to occur in the form of fissures or furrows, which may be converted into small, superficial, ragged ulcers. Upon the dorsum of the tongue, the lesions occur in the form of circular or oval patches, the surface being smooth, as if shaven, from loss of the papillæ. Upon the tonsils the mucous patches are apt to become disintegrated, forming superficial or deep ulcers. At the angles of the mouth they are often complicated with fissures, and may be continuous with papules of the cutaneous surface.

Diagnosis.—Mucous patches are most often confounded with aphthae. The latter lesions, however, are more yellow in color, exhibit a cup-shaped depression with a bright red border, and are exceedingly painful. The mucous patch is distinguished by its more superficial seat, and its grayish-white color. Mucous patches may be distinguished from buccal herpes by a difference in grouping and the polycyclic outline of the latter. Each lesion is surrounded by epithelial débris formed by the remains of the purulent vesicle. Mercurial stomatitis may cause erosions, which may be mistaken for mucous patches. Their favorite seat is behind the last molar tooth and upon the sides of the tongue. The characteristic signs of mercurial stomatitis—salivation, fetid breath, and red, spongy gums—serve to differentiate it from mucous patches.

The tertiary lesions of the mucous membranes consist of tubercles and gummatous deposits, which may be limited to the mucous membrane or may be implanted in the deeper tissues. They are usually limited and localized, but may occur in the form of a diffuse infiltration.

Superficial glossitis is characterized by a circumscribed or diffuse thickening of the submucous cellular tissue, resulting in a lamellated induration, presenting a red, glossy appearance of the surface. Deep or parenchymatous glossitis invades the muscular tissues of the tongue, which becomes tumefied and sometimes enormously hypertrophied. The surface presents a rough lobulated appearance, which is quite pathognomonic. Ulceration may occur from accidental irritation.

Gummata of the tongue may develop in the mucous, submucous, or muscular tissues. Superficial gummata occur as small nodules beneath the epithelium, either singly or in groups. The deep or parenchymatous gummata are situated in the muscular substance of the tongue. Upon ulcerating they expose deep cavities, with overhanging, sloughy walls. They may assume a serpiginous form. Gummatous patches of the soft palate or palatine arch often do irreparable mischief by destroying the soft parts and perforating the maxillary bones. The tonsils and posterior walls of the pharynx may be the seat of tuberculo-ulcerous gummatous lesions.

Leucoplasia, or the so-called syphilitic psoriasis of the tongue, consists of flattened or grayish-white patches, usually developed upon the dorsum. They are due to thickening and condensation of the epithelium, which gives them a tough, leathery consistence. They rarely become eroded or ulcerated. Leucoplasia may affect the sides of the tongue, but rarely the under surface. Another favorite seat is inside the cheek at the angles of the mouth and lower lips. The duration of leucoplasia is practically unlimited; in most cases, it persists for months or years, or even during life. It derives its chief clinical importance from the fact that it may undergo an epitheliomatous transformation, especially in persons who are addicted to the excessive use of tobacco.

Diagnosis.—Tertiary lesions of the buccal mucous membrane present many points of resemblance to tubercular ulceration and to epithelioma. Tubercular ulceration is more superficial than the gummatous ulcer, more painful, and may occur on the under surface of the tongue where syphilis is rare. It is frequently coexistent with tuberculosis of the cutaneous surface. The diagnosis between syphilis of the tongue and epithelioma is, clinically, of the highest importance. Doubtless many cases have been operated upon for cancer of the tongue, which might have been cured by anti-syphilitic treatment. The chief points of distinction are the more circumscribed and vegetating character of the epithelioma, with hard everted borders, and its localization on the side of the tongue. It is more painful than syphilis and the neighboring glands soon become affected. The age of the patient also constitutes a differential sign. In doubtful cases, a histological examination should be made. Tertiary lesions involving the soft palate and tonsils may also present certain points of resemblance to tubercular ulceration and to cancer.

The Esophagus.—Syphilis of the esophagus is comparatively rare. Stricture of the esophagus may result from gummatous infiltration in the submucous tissues, followed by ulceration. More often the esophagus is secondarily involved from gummata in the mediastinal glands, which break through its walls producing stenosis with dysphagia.

Stomach.—Syphilis of the stomach is much more common than was formerly supposed. Many cases of chronic gastritis, gastric ulcer, and, so-called, gastric cancer, are caused by syphilis. It is claimed that ten per cent of all cases of round ulcer of the stomach are of syphilitic origin. Unfortunately, there are no absolute signs which serve to demonstrate the nature of the gastric lesions, except the test of specific treatment.

The Intestine.—Syphilis of the intestine is rarely recognized *in vivo*, although numerous autopsies have disclosed the existence of syphilitic lesions occurring in the form of infiltrations localized principally in the upper part of the intestinal canal, which break down and form ulcerative lesions. The scars which result are flat and may cause stenosis of the canal. The symptoms may simulate those of typhoid. In cases of ulcerative enteritis, of obscure origin, anti-syphilitic treatment should be employed, especially when other specific manifestations are present.

The Rectum.—Syphilitic ulceration of the rectum derives its chief clinical importance from the frequency with which it is followed by stricture of the rectum. The cicatricial contraction may proceed from an ulcerative gumma or more frequently from a diffuse gummatous deposit in the ano-rectal walls, which degenerates into a retractile fibrous tissue.

The Liver.—Of all internal organs of the body, the liver is the most frequently subject to syphilitic changes. Affections of the liver, of a purely congestive nature, may occur in the secondary stage, accompanied with slight enlargement of the organ, icterus, and other symptoms of gastro-intestinal derangement. Of the late lesions of the liver, two forms may be distinguished, namely, interstitial and gummatous hepatitis. These two pathological alterations may be associated and may involve a portion of the organ or the entire liver. Chronic interstitial hepatitis may be either circumscribed or general. The changes are first hypertrophic, resulting in the irregular, lobulated condition characteristic of cirrhosis and accompanied with emaciation, ascites, etc. Gummata of the liver develop in the shape of pea to walnut sized masses, sometimes as large as a hen's egg, which are embedded in the substance of the organ, and said to be more common in the right lobe. They undergo a condition of necrosis or caseous degeneration, with an increase of the connective tissue, and a disappearance of the liver tissue. In this way, large areas may disappear, or even the entire lobe.

The **pancreas** is seldom affected except in the hereditary form of the disease.

The **splenic lesions** of syphilis are also most characteristically seen in hereditary syphilis.

SYPHILIS OF THE RESPIRATORY SYSTEM.

The Naso-pharynx.—Tertiary lesions of the nasal passages, involving the cartilages and bones leading to necrosis and the production of the offensive condition known as ozena syphilitica, are common to both acquired and hereditary syphilis. Perforation of the septum may occur, with destruction of the nasal bones, causing a flattening or falling in of the bridge of the nose, which, with a tilting up of the apex, constitutes a characteristic deformity. The ulcerative process may extend along the Eustachian tube and produce partial or complete deafness. Naso-laryngeal ulcerations, due to disintegration of gummatous deposits, may give rise to extensive ulcers, which may sweep away the epiglottis, vocal cords, and other structures of the larynx. These losses of structure are of a deforming and permanent character, interfering with phonation and swallowing.

The Trachea.—The trachea may also be attacked by tertiary syphilis. The gummatous infiltration soon leads to ulceration, followed by perichondritis and necrosis of cartilage. Perforation of the trachea, with a more or less permanent external opening, may occur. When healing of these lesions takes place, the cicatricial contraction often causes stenosis of the trachea, producing serious dyspnea or even an alarming apnea.

The bronchi may also be the seat of tertiary syphilis. The bronchial lesion is often bilateral, and may be followed by stenosis of the affected bronchial tubes.

Lungs.—Syphilis of the lungs occurs in the form of circumscribed gummata or diffuse infiltrations. Recent advances in our knowledge teach that syphilis plays a much more prominent rôle in the causation of lung disease than was formerly suspected. In many cases cicatricial and other changes, found post-mortem in the lungs, are recognized as due to syphilis.

SYPHILIS OF THE CIRCULATORY SYSTEM.

The Heart.—Our knowledge of syphilis of the heart is a comparatively modern acquisition. There are many functional disorders of the heart, of a neurasthenic type, which are referred to syphilis as the exciting cause. Grave functional disorders of the heart may be due to changes in the central nervous system, causing compression of or irritative changes in the vagus, but the more important pathological changes, which have been demonstrated by autopsy, have an anatomical foundation, and are recognized as due to tertiary syphilis. Next to rheumatism, syphilis must be regarded as the chief factor in diseases of the heart. Three distinct morbid conditions are recognized as due to tertiary syphilis: myocarditis, endocarditis, and pericarditis.

Myocarditis is caused by small gummata in the muscular substance, with secondary degeneration of the muscular fibres, and the conversion of the cell infiltration into fibrous or sclerotic tissue. The gummata in the myocardium are usually of the miliary type, or else they form nodular tumors which undergo a fatty or caseous degeneration peculiar to syphilitic products. This destructive process may involve the papillary muscles and valves of the heart.

Syphilitic endocarditis and pericarditis are usually associated processes, consecutive to syphilitic disease of the myocardium. Dilatation of the heart, without evidence of valvular lesion, is said to be always suggestive of syphilis.

Angina Pectoris.—True angina pectoris, caused by lesions of the aorta or coronary arteries is, it is asserted, always due to syphilis. Most authorities assign a predominating influence to syphilis in the causation of many diseases of the heart, of obscure origin. The advice of Semola is to fight the disease with iodides of mercury, even when there are no other manifestations of specific disease present.

Syphilitic Arteritis.—Since practically all the pathological lesions of syphilis are caused by changes in the blood vessels, it is not surprising that syphilitic arteritis, atheroma, arterio-sclerosis, aortitis, and aneurism should be classified among the manifestations of syphilis. The syphilitic origin of aneurism, in a proportion estimated at from fifty to seventy per cent or more, is well attested.

SYPHILIS OF THE GENITO-URINARY SYSTEM.

Urethra.—Gummata of the urethra have been observed, as well as pericavernous gummata.

Epididymis.—Syphilis of the epididymis is exceedingly rare. It is usually manifested by a small nodule or tumor the size of a pea, or larger, situated upon the globus major. This hard nodule undergoes resorption spontaneously.

Syphilitic Orchitis.—Syphilis of the testicles is more common than is generally stated by text-book authorities. Slight infiltrations are often overlooked, as they are painless and do not lead the patient to apply to the surgeon for relief. Syphilitic affections of the testis, while occasionally occurring in the secondary period, may be properly classed among the tertiary lesions.

Interstitial Orchitis.—Interstitial orchitis may develop as an interstitial hyperplasia or thickening of the tissues of the organ. The organ becomes enlarged, heavier and harder than normal, though, as a rule, the process is at first indolent and painless; later there may be dragging pains. The interstitial growth may degenerate into fibrous or sclerotic tissue. Not infrequently, its involution results in obliteration of the seminal tubes, atrophy of the testis, etc.

Gummatous orchitis of one or both testicles occurs in the form of nodules or tumors upon the surface or in the body of the testicle, which pursue the usual course of gummata in other organs. They become adherent to the skin and then break down, with a discharge of yellowish-white, fatty, or caseous material. The function of the testicle is usually entirely destroyed.

Diagnosis.—The diagnosis between syphilitic orchitis, tuberculosis, and cancer of the testicle, often presents difficulties. Tuberculosis usually begins in the epididymis, it is exceedingly slow in its evolution, more or less painful on pressure, and often involves the spermatic cord. Cancer of the testicle is more rapid in its evolution, and the fungation of the testis is common. Usually there is enlargement of the inguinal and other glands. The test of specific treatment is an important differential sign.

Bladder and Prostate Gland.—Syphilitic lesions of the bladder and prostate are comparatively rare, but such cases have been reported as cured by specific treatment.

Kidneys.—A possible etiological relationship between syphilis and many obscure affections of the kidneys has been recognized within the past few years. The frequency with which albumen is met with in syphilitic subjects is a matter of common observation. This was formerly attributed to the fact that the excretion of mercury sets up an irritation of the kidneys, with the production of considerable quantities of albumen, which cannot be differentiated from albuminuria due to other causes. Syphilis of the kidneys may occur as a diffuse hyperplasia, in the form of gummy tumors or amyloid degeneration of the vessels. Chronic syphilitic nephritis does not differ essentially in its symptoms from the interstitial nephritis due to alcohol and other causes. The pathological condition consists in fibrous infiltration of the kidney substance, and degeneration of the tubes. Gummatous deposits in the kidneys are comparatively rare, though they have been found postmortem in these organs. They may be situated upon the surface of the organ or embedded in the thickness of the cortical substance. Their presence usually gives rise to symptoms of parenchymatous nephritis. Amyloid degeneration is another result of sclero-gummatous changes. To what extent syphilis acts as a factor in the production of Bright's disease is not definitely determined. It has been stated that from twenty-five to thirty per cent of autopsies show renal lesions, attributable to syphilis, apart from amyloid disease, and that about twenty-five per cent of syphilitics die with lesions of the kidneys.

FEMALE ORGANS OF GENERATION.

Tertiary syphilis may affect all parts of the **vulva**, producing hypertrophic syphiloma of the labia, simulating elephantiasis. Tertiary ulceration of the vulva, causing various mutilations and deformities, may result from the breaking down of gummatous infiltrations. Syphilitic lesions of the **vagina** are rare, except when due to extension from lesions of the vulva. The **uterus** may be affected by syphilis, in the form of syphilitic endometritis and parenchymatous metritis. Gummatous neoplasms have also been found in the walls of the uterus post-mortem. In some instances they have been confounded with uterine fibromyomata; but their syphilitic origin has been proven by their disappearance under specific treatment. Gummata have also been found in the **uterine tubes.** A condition of chronic fibroid syphilitic salpingitis has been described.

The **ovaries,** like the testicles, may also be affected by syphilis, although more rarely; on account of their inaccessible position, the diagnosis is not so readily made.

The **peritoneum** may be affected by gummatous peritonitis, simulating gonorrheal peritonitis. The **pelvis** may be the seat of tertiary syphilis in the form of osseous gummata of the bones of the pelvis.

Gummata of the Mammary Gland.—Gummata of the mammary gland, while comparatively rare, are sometimes met with, and may be mistaken for other tumors. The gummatous deposit in the gland often breaks down, forming a typical crateriform ulcer.

SYPHILIS OF THE MOTOR SYSTEM.

Muscles.—Syphilis may affect the muscles, tendons, bones, or joints. Syphilitic affections of the muscles consist of diffuse hyperplasias of the connective tissue, or the development of gummy tumors in the sheaths or in the substance of muscles. Both forms may result in atrophy of the muscular fibres, shortening, contractions, and impairment of function.

Tendons.—Inflammation of the tendon sheaths may occur in the secondary stage of syphilis. It usually affects the extensor tendons of the fingers, toes, biceps, and, less commonly, the tendons about the knee-joint, or the tendo Achilles.

Syphilitic affections of the bursae are uncommon. The bursa over the patella is most frequently involved, owing perhaps to the irritation or pressure to which it is subjected in certain occupations.

The Bones.—Osseous lesions of syphilis may develop in the early stage, although the more characteristic changes in the bones occur in the tertiary stage. In the early stage they are limited to periosteal inflammation, rarely periosteal nodes; gummatous deposits occur in and beneath the periosteum and in the bone substance. Gummata may develop on the skin or mucous membranes and involve the periosteum secondarily. This is especially liable to occur in regions where the bones have a thin covering, as over the external aspect of the tibia, cranium, clavicle, and so forth, and also the bones of the nose. The periosteum is destroyed and there is necrosis and exfoliation of the bone tissue. In other cases, the gummata are developed in the deeper tissues or spring from the periosteum. Suppuration is a comparatively rare termination of syphilitic periostitis. The gummata may, however, soften and break down, the skin become inflamed, and the contents be evacuated by means of one or more openings through which pieces of necrosed bone are often discharged.

Periostitis may also occur in the form of flattened or convex tumors, termed nodes, which vary in size from one-half to two inches in diameter, and form a considerable elevation above the surface. They may disappear under specific treatment or become transformed into bony tissue and constitute exostoses.

Another manifestation of bone syphilis is osteomyelitis. It consists of a diffuse, gummatous infiltration through the cancellous structure, resulting in condensation and thickening of the bone. As a result of the osseous lesions, there is increased porosity of the bone and other structural changes, with increased liability to fracture from trivial causes.

The smaller long bones, like the clavicle and phalanges, may become rarefied by extensive gummatous infiltrations and produce a condition known as spina ventosa.

Syphilitic Dactylitis.—Tertiary lesions of the gummatous type may affect the periosteum, or else be seated underneath the periosteum or in the medullary membrane of the phalanges. They may affect one phalanx or more. The swelling is usually fusiform or acorn-shaped, hard, firm, and terminating more or less abruptly. Suppuration is rare; most frequently involution occurs through resorption without disintegration of the gummatous tissue. Atrophy and shortening of the bones, or the formation of a false joint, are not infrequent results.

The Joints.—The joints may be affected early in syphilis, giving rise to arthralgia, affecting more particularly the large joints of the shoulder, knee, and wrist. Hydrathrosis may also occur early. The effusion in the joint may be unaccompanied with any inflammatory phenomena. At a later stage syphilis affects the synovial membranes of the joints by processes similar to those affecting the periosteum, resulting in syphilitic arthritis. Several large joints may be affected, giving a most deceptive appearance to gonorrheal arthritis. Gummatous deposits in the articular ends of the joints or epiphyses, and more rarely, the diaphyses, occur in the tertiary stage. The gummata may break into the joint or form superficial sinuses; the usual result, however, is fibrous anchylosis. It is not readily amenable to specific treatment, and demands surgical intervention. The bones of the vertebrae may also be involved by gummatous processes, simulating Pott's disease. Syphilitic spondylitis is a comparatively rare manifestation.

SYPHILIS OF THE EYE AND EAR.

Syphilitic affections of the eye, especially of the fundus, and paralysis of the nerves supplying the eye, are often a manifestation of brain syphilis, and possess a grave significance.

Cornea.—Syphilitic affections of the cornea are exceedingly rare in acquired syphilis, although quite common in the hereditary variety. Syphilitic keratitis may manifest itself in either the punctate or diffuse form. Interstitial keratitis is one of the most common and characteristic manifestations of heredo-syphilis.

Iritis.—Of all specific affections of the eye which come under the observation of the venereal specialist, iritis is the most significant, not only on account of its comparative frequency, three to four per cent in acquired syphilis, but from its frequent unfortunate results upon the integrity of the vision. In the tertiary stage it is comparatively rare, usually developing in the early secondary stage, about the sixth month after infection. There are two forms of syphilitic iritis, the serous and plastic. In the serous form, the eye presents a pinkish-red appearance from the injection of the ciliary vessels, with the presence of small white spots or deposits on the posterior surface of the cornea. There is increased lachrymation, accompanied with subjective sensations of supraorbital pain and sensitiveness to light. The milder form usually clears up under suitable treatment, without permanent changes. Plastic iritis represents a more aggravated form. The congestion of the ciliary vessels is much more marked, the iris is hazy and muddy, and the outline of the pupil irregular, presenting often a scalloped appearance, due to adhesions with the anterior capsule of the lens from effusions of plastic lymph. On account of these adhesions and thickening, the pupil does not readily respond to impressions of light; the opening of the pupil may be permanently occluded from loss of dilatability. Gummatous iritis is comparatively rare. The gumma may appear as a small yellowish-red neoplasm springing from the iris, and may attain to a considerable size, entirely filling up the pupillary space. One or both eyes may be affected.

Retina and Optic Nerve.—Syphilitic cyclitis, choroiditis, disseminate choroido-retinitis, optic neuritis, papulitis, and the various atrophic changes which may follow syphilis of the retina and optic nerve, come more especially within the province of the ophthalmologist.

Motor Affections.—Paralyses of the nerves supplying the eyes are almost exclusively due to syphilis. The diplopia is distinguished accordingly as paralysis of an abductor or adductor muscle occurs. Paralysis of the third nerve causes dropping of the eyelids, immobility of the globe, deviation outward of the external rectus, and dilatation of the pupil. Seventy-five per cent of all cases of ptosis are due to syphilis. Paralysis of the sixth nerve produces deviation of the eye inward and diplopia. Paralysis of the fourth nerve commonly occurs in connection with paralysis of other cranial nerves. The motor affections of the eye may be caused by a multiplicity of lesions, as gummatous deposits in the nerves and meninges, or pressure from gummata, as well as arterial changes at the point of origin of the cranial nerves or along their course. They are frequently associated with hemiplegia or other evidences of implication of the nervous system.

Syphilis of the Ear.—As before intimated, the ear is usually affected by ulcerations in the naso-pharyngeal cavity, leading to the occlusion of the orifices of the Eustachian tube; or, the ulcerative process may involve the middle ear from extension along the course of the tube. The more serious affections of the auditory nerve resulting in syphilitic deafness and deaf-mutism, although met with in the acquired form, are more common in hereditary syphilis, and are often associated with other dystrophies peculiar to heredo-syphilis. The pathology is obscure, as the complete loss of function of hearing may be sudden, and occur without appreciable lesion of the auditory apparatus.

SYPHILIS OF THE NERVOUS SYSTEM.

The advances made in our knowledge of the pathology of the nervous system have singularly amplified our conception of the importance of the pathogenetic rôle played by syphilis. At the present day syphilis is recognized as the chief etiological factor in organic diseases of the nervous system, and one of the principal causes of dementia.

Syphilis of the nervous system embraces a vast array of morbid manifestations. There is scarcely any functional or organic disease of the brain, spinal cord, or nerves which may not be produced by syphilis or its symptoms accurately simulated. The restricted limits of this article will not permit a detailed description of the varied and multiple manifestations of syphilis of the nervous system. Certain functional phenomena met with in the secondary stage of syphilis, such as cephalalgia, sternalgia, analgesia, muscular tremors, hystero-epileptiform spasms, etc., are due to the impression of the poison upon the nervous system. The headache of syphilis is characterized by its intensity, its diffuse character, and its tendency to nocturnal exacerbation.

The more important syphilitic affections of the nerves belong essentially to the tertiary period. They are usually met with after the third year, exceptionally within a few months after the initial lesion. According to Fournier's statistics, embracing seven thousand two hundred and forty-nine tertiary accidents, occurring in five thousand six hundred and ninety-eight cases, the relative frequency of nerve lesions was shown by the fact that there were two thousand three hundred and ten cases of nerve affections, thirty-one per cent, almost one-third, implicating the nervous system. Among these, there were nine hundred and three cases of cerebral syphilis, one hundred and ninety-six cases of medullary syphilis, one hundred and sixteen cases of general paralysis, and nine hundred and forty-three cases of tabes.

While cerebral syphilis may appear within the first year of the infection, it increases in frequency, and attains its maximum in the third year, with a progressive decrease to the tenth year and beyond. Tabes rarely appears before the second year; the majority of cases develop from the fifth to the ninth year. General paralysis is rare before the fifth year, the larger proportion of cases occurring between the sixth and twelfth years, and being most marked in the tenth year.

The lesson to be learned from these statistics is that the worst effects of syphilis of the nervous system develop from the fifth to the tenth year of the disease.

Among the predisposing causes which determine the localization of syphilis toward the nervous system may be mentioned hereditary predisposition to nervous disease, nervous exhaustion, and alcoholic and venereal excesses. It is to be noted that many severe examples of brain syphilis have been found in persons whose initial symptoms were mild and insignificant, and who had not received specific treatment. Fournier regards the absence of specific treatment as the chief cause of tertiary manifestations.

Syphilis affects the nervous system in three ways:

(1) By causing disease of the arteries interfering with nerve nutrition.

(2) By the development of gummatous processes in the meninges, and in the substance of the nerve.

(3) By compression of the brain, cord, and nerves from morbid growths which may result from exostoses of the cranial bones and spinal vertebræ, by thickening of the dura mater, or by narrowing of the bony canals through which the nerves pass.

Probably syphilitic endo-arteritis and peri-arteritis, caused by the development of gummatous nodules or infiltrations of the coats of the cerebral vessels, is the most common cause of pathological alterations in the nerve substance. These deposits lead to obliteration of the lumen of the vessels and consequent ischemia and circumscribed softening.

Of the meninges of the brain, the dura mater is the most frequent seat of tertiary lesions, consisting of gummata or diffuse infiltrations resulting in thickening and sclerosis. Gummata of the dura mater may extend along the pia mater and invade the brain by a direct growth. Gummata of the brain substance usually originate in the pia mater or subarachnoid space. They grow towards the cortex of the organ, or may penetrate the gray substance, sometimes encroaching upon the white matter. They are most frequently seated in the optic tract, the anterior lobes, at the surface of the frontal convolutions, the pons Varolii, and the base of the brain.

In addition to the varied and multiple phenomena which characterize brain syphilis, such as monoplegia; hemiplegia, often bilateral; insanity; epilepsy, etc., there are various neuroses of the peripheral nerves, more especially the ulnar and sciatic, which may occur as a syphilitic process. Such neuroses may be limited to sensory disturbances of a more or less painful character, and later may result in motor atrophic disturbances.

Spinal-cord.—According to Gilles (de la Tourette), more than half the cases of diseases of the spinal-cord are due to syphilis, exclusive of tabes, which considerably increases the proportion. Syphilitic processes may affect the meninges or the interstitial tissue of the cord itself, causing meningitis or myelitis. The two are most commonly associated as meningo-myelitis, or the latter may be due to passive pressure from exostoses and caries of the vertebræ. Paraplegia, paralysis of the bladder, and sphincter ani, ataxic symptoms, with the group of sensory disturbances peculiar to tabes, may result from syphilis of the cord.

The etiological relationship of syphilis to tabes dorsalis, which has long been the occasion of lively controversy, may be considered definitely established by clinical evidence.

HEREDITARY SYPHILIS.

The susceptibility of syphilis to hereditary transmission is a fundamental character of the disease; it may be transmitted to the offspring directly by the infected sperm of the father, or from the infected ovule of the mother at the time of impregnation, or the infective principle may be conveyed through the medium of the utero-placental circulation during the course of pregnancy.

The terms "congenital" and "hereditary" syphilis are often used indiscriminately, but we must recognize the fact that "congenital" is a broader term than "inherited." All that is congenital is not inherited, and much that is inherited is not apparent at birth. Properly speaking, the term hereditary syphilis is applied to cases of germinal infection through the spermatozoön or ovum. Congenital syphilis embraces, in addition, cases of post-conceptional syphilis conveyed through the placental circulation in the course of pregnancy.

Paternal Transmission of Syphilis.—A syphilitic man may beget a syphilitic child, and the mother remain exempt from signs of contamination. The paternal influence is, however, comparatively restricted in its duration, being rarely manifest after the third or fourth year. As regards its effect upon the fetus, the mortality of the offspring is given as twenty-eight per cent, and the morbidity as thirty-seven. The question of the paternal transmission of syphilis to the fetus without the preliminary infection of the mother has been the subject of prolonged controversy; clinically, the affirmative evidence rests upon the following grounds:

Healthy children may be born after treatment of the father alone with mercury.

A woman who has given birth to syphilitic children by a syphilitic father may have healthy children by another father.

Cases are on record where a woman who has given birth to a syphilitic child has afterward acquired syphilis.

The statistics of Kassowitz, Mewes, Anton, Hochsinger, Fournier, and others, would seem to show in the most positive manner that in hundreds of pregnancies which terminated in abortions, still births, and syphilitic children, the mothers remained absolutely healthy or, at least, exempt from all signs of the disease. It has been alleged that it is impossible for the spirochete to permeate the spermatozoön as it is the larger of the two bodies; but, on the other hand, it has been suggested that the fluid part of the semen may serve as a vehicle for the spirochete, or that it may attach itself to the spermatozoa as it does to the red blood corpuscles (Rilli and Vockorodt). Moreover, syphilitic semen has been successfully inoculated in chimpanzees by Neisser and Finger.

Maternal Transmission.—A syphilitic woman may bring forth a syphilitic child, the father being perfectly healthy. The transmissive power of the mother is much more active and pronounced than that of the father. The mortality is given as sixty per cent and the morbidity as eighty-four per cent. It is also much more prolonged in duration, five or six years, or longer.

Mixed Transmission.—When both parents are syphilitic at the time of fecundation, the transmissive power of syphilis acquires its maximum of intensity, causing a morbidity of ninety-two per cent, with a mortality of sixty-eight per cent in private practice, and eighty-six per cent in hospital practice. Very often the mortality is one hundred per cent, thus extinguishing *in toto* the posterity of certain families.

Syphilis by Conception.—The term "conceptional syphilis" is applied to a class of cases in which a healthy mother is infected by the syphilized fetus, procreated by a syphilitic father who may, at the time, be exempt from any cutaneous or mucous membrane manifestations, and incapable himself of directly communicating the disease to his wife. The fetus serves as the intermediary agent for the transmission of the disease, by means of the utero-placental circulation, from the father to the mother. Syphilis contracted by the mother in this way may be made evident by positive signs of the disease during pregnancy or later. In many cases there is an exemption of the skin and mucous membranes from the more characteristic manifestations of syphilis, and the disease may not reveal itself until some years later, when it does so by severe tertiary manifestations. The relative mildness of conceptional syphilis in the mother has been attributed to the more gradual syphilizing effect of the morbid germs and their toxines through the placental walls. So far as the child is concerned, the influence of the paternal infection is often fatal, resulting in its death and premature expulsion.

Modifications in the Hereditary Influence.—The age of the syphilis, specific treatment, and other circumstances modify the hereditary influence of the parents. Time exerts a marked attenuating influence upon the diathesis, there being a progressive enfeeblement of the parental infection, as shown in the series of successful pregnancies. Abortions may take place at a more and more advanced period of fetal development, until finally they cease, and a pregnancy results in a child living, but syphilitic; still later in children bearing no trace of the disease. Specific treatment may also suppress or hold in temporary abeyance the influence of the parents. A mother may have one or more abortions from syphilis; and then if she be subjected to active treatment, and pregnancy occur, she may bring forth a healthy child. If treatment be now discontinued, the next pregnancy may result in a syphilitic child. It has been shown that treatment of syphilitic women by mercurial inunction reduced the number of abortions more than fifty per cent. The remarkable effect of specific treatment in correcting or neutralizing the hereditary influence of syphilis is, however, subject to exception.

Post-conceptional Syphilis.—A woman, healthy at the date of conception, may afterward contract syphilis and transmit it to her child *in utero,* the father being absolutely healthy. The danger to the child is less the later in pregnancy the infection occurs. It may be laid down as a general rule that contamination of the fetus is not probable if the maternal infection takes place after the seventh month of pregnancy. Numerous statistics demonstrate the pernicious influence of post-conceptional syphilis upon the offspring, when the infection occurs between the second and sixth months. The death of the child *in utero* is the most frequent result.

Effects of Syphilitic Heredity.—Whether the infection is communicated through the sperm cell, the ovule, or the utero-placental circulation, the uterine death of the fetus is the most habitual expression of hereditary syphilis. Hereditary syphilis is one of the most common causes of abortion. This may be due to changes taking place in the placenta. Certain pathological changes may occur in the various organs of the fetus, diffuse or gummatous infiltrations of the bones, liver, lungs, kidneys, nerve centres, and other organs. Hepatic lesions and lesions of the nerve centres constitute the most prolific cause of death of syphilitic children. The syphilitic child may be born alive, with characteristic evidences of syphilitic taint. It may be born apparently healthy, and after a certain period, usually within a few weeks or months, begin to show the stigmata of the parental disease; or definite symptoms may be delayed, with especial liability to appear at the period of second dentition, the period of puberty, or not until the twentieth or thirtieth year or later (late hereditary syphilis). Many lesions, formerly referred to scrofula or tuberculosis as the generating cause, are now recognized as being due to syphilis. Evidences of hereditary syphilis may be manifest in symptoms peculiar to syphilis, and which are met with in the acquired form, or by certain lesions which are the result of changes impressed upon the fetus in its formative stage, and which take on the characters of arrested development, or degenerations due to perversions of nutrition. These dystrophies may be limited to a single organ or system of organs, or they may affect the entire body. The spirocheta pallida is found in the greatest abundance in the heredo-syphilitic lesions and in the internal viscera, as well as the various lesions of the skin.

Manifestations of Hereditary Syphilis.—Even when the child is born alive and apparently healthy, there is usually an outbreak of specific eruptions within a short period, ranging from the second week to the first or second month. One of the earliest and most characteristic manifestations of hereditary syphilis are bullous lesions of the palms and soles. If pemphigus is present at birth, it always carries with it a grave prognosis. Another early manifestation is syphilitic coryza, caused by structural changes in the mucous membranes of the air passages. This condition, known as the "snuffles," is almost pathognomonic of inherited syphilis, and carries with it a certain significance, as the obstruction in the nostrils may be so complete as to prevent the child from nursing.

The skin and mucous membrane manifestations of hereditary syphilis are similar to those of the acquired form, as erythema, papules, pustules, and tubercles. On account of the delicacy of the skin, papules are quickly transformed into mucous patches; the moist or humid form predominates. Fissures and condylomatous patches about the mouth, genitals, and anus are much more common. Lesions of the viscera often coexist with the early cutaneous manifestations. Death most often occurs from gastro-intestinal complications, from marasmus, or from cachexia impressed upon the organism. The severity of inherited syphilis is generally exhausted during the first two or three years of infantile life. This period may mark a definite end of the disease, or a new train of symptoms may arise in connection with the second dentition.

Hereditary syphilis is further differentiated from the acquired form by certain processes which are its exclusive products, as peculiar changes in the bones, dental malformations, lesions of the eye, and of the auditory apparatus. The milk teeth of syphilitic children are apt to be malformed, chalky, and lost early. The peculiar dental changes characteristic of inherited syphilis are displayed in the permanent central incisors, which are denominated "syphilitic test teeth." This specific abnormality consists in the narrowing of the cutting border of the teeth, giving them a peg-shaped form, with a peculiar crescentic-shaped notch of the cutting edge. Besides this, they are apt to be smaller, and converge towards each other with a large interspace. These dental abnormalities, interstitial or parenchymatous keratitis, and deafness constitute specific characteristics of inherited syphilis.

Independent of these various lesions of particular structures and organs, hereditary syphilis may reveal its specific origin by certain characters expressed in the physiognomy and the physical and mental development. The newly born syphilitic infant is variously described as a small, wizened, puny, weakly creature. It has a peculiar aged appearance, the "old man look," as it is termed, which is quite pathognomonic. The skin is loose and flabby, the hair scanty, and the nails undeveloped. The complexion is usually of a pale, grayish, *café au lait* color, presenting a marked contrast with the pinkish or rosy hue of health. The vital capacity of the infant is materially impaired. The influence of syphilitic heredity is often manifest in a latent debility or inherent incapacity for life. The child succumbs to slight ailments, often without any apparent cause. It dies without reason, so to speak, and the autopsy may reveal nothing that can be assigned as the cause of death.

A second type of inherited syphilis is characterized by slowness or retardation of development, the growth being stunted and dwarfed. Such children grow slowly; they walk, speak, and develop their teeth slowly, and seem to remain long in a state of infancy. The genital organs are often rudimentary and undeveloped. The term "infantilism" is employed to express the sum total of these characteristics. The intellectual development is likewise retarded. The child is apt to be slow in learning, either from congenital deficiency of the mind or from a kind of intellectual asthenia.

The malformations and dystrophies of infantile syphilis are too numerous to describe in detail. The rachitic type, with large head, occupied by bossy growths, incurvation of the tibia, pigeon-breast malformation of the thorax, curved spine, deformed pelvis, etc. There is another group of dystrophies which present a marked deviation from the normal type, with resulting monstrosities. Fournier terms such cases an exaggeration or amplification of dystrophies.

TRANSMISSION OF SYPHILIS TO THE THIRD GENERATION.

Clinical observation shows most conclusively that certain dystrophies and organic defects in the subjects of hereditary syphilis may be transmitted to the third generation. The question which divides medical opinion is whether heredo-syphilitics may transmit their disease in a virulent form, charged with contagious activity. Theoretically, there is nothing in this view inconsistent with the most recent advance of our knowledge. Neisser's experiments in successfully inoculating monkeys with syphilitic products from the ovary and from gummatous lesions as late as the seventeenth year of the disease, together with recent researches which show that the spirocheta pallida may be demonstrated in syphilitic lesions at the age of puberty or later, lend support to this view. We have overwhelming testimony which shows in the most positive manner that the influence of heredo-syphilis in determining abortions, still-born children, and various dystrophies is scarcely less marked than that of acquired syphilis. Fournier gives statistics of one hundred and sixteen examples of transmission to the third generation: out of three hundred and sixty-seven pregnancies there were one hundred and eighteen abortions; fifty-nine early births; and one hundred and ninety-two survivors, a mortality of forty-eight per cent. Of the survivors only thirty-one appeared free from hereditary syphilis. The only element of doubt in these cases is the possible intervention of acquired syphilis as a factor.

Positive evidence of the transmission of syphilis to the third generation must be based upon the following conditions:

(1) That the grandparents, one or both, had syphilis.

(2) The hereditary nature of the syphilis in the third generation.

(3) The exclusion of father or mother having an acquired syphilis.

Fournier gives a detailed report of eighteen families in which the condition of the grandparents, the parents, and descendants was distinctly known. In these eighteen families, there were eighty-five pregnancies which terminated as follows: Twenty-five abortions, two of which were twins; thirty infants born dead, or dying within a short time; thirty living children. In another table he gives the issue of forty-six families of heredo-syphilitics: one hundred and forty-five pregnancies, terminating in forty-five abortions; thirty-six still-born, or dying early; sixty-five living children in whom he found the same kind of dystrophies as characterize hereditary syphilis in the second generation.

While we cannot conclude that syphilis is transmitted in its essential nature as a virulent contagious disease to the third generation, yet it is well known that heredo-syphilis kills the product of conception or transmits to the survivor an impaired vitality with various dystrophies, and thus constitutes a chief factor in the physical, mental, and moral degeneration of the race. From an exhaustive study of heredo-syphilis Tarnowsky concludes that syphilis has an incomparably more fatal influence upon the species and on society than on the individual.

TREATMENT OF SYPHILIS.

The question of the abortion of syphilis by destroying the virus at its point of entrance has already been considered. The failure of abortive methods such as excision or destructive cauterization of the initial lesion is probably due to the rapidity with which the infection of the system takes place through the lymphatics and blood vessels.

Remedies.—Two drugs, mercury and iodide of potassium, constitute the basis of all specific therapeutic treatment of syphilis. In the treatment of eruptions of the secondary stage, the action of mercury is prompt and curative; it abates their intensity and hastens their involution. Iodide of potassium finds its special application in the treatment of lesions of the gummatous and ulcerous type, and the interstitial hyperplasias of the viscera; the rapidity of its action in melting away gummatous deposits and arresting ulcerative processes is most marked. For the lesions of the intermediary stage, the use of these drugs in combination, constituting the so-called "mixed treatment," is often more efficacious than either alone.

Object of Treatment.—Syphilis is intermittent in its manifestations, and after apparent cure the disease may reveal itself months or years later by tertiary manifestations of the gravest significance. The object of treatment then is not simply to cure existing manifestations, but to prevent their development in the future. Clinical experience shows that the active use of mercury through the first two or three years of syphilis constitutes the most reliable safeguard against tertiary manifestations.

Fournier insists that a sufficient mercurial treatment affords a preventive guarantee, if not complete, at least relative, against tabes and general paralysis. His careful study of six hundred and fifty-five cases shows that tabes or general paralysis followed in only 5.56 per cent of cases which had been subjected to a careful mercurial treatment for three years or longer; while 95 per cent, or to be more accurate 94.44 per cent, succumbed to short and insufficient treatments.

General Considerations in the Administration of Mercury.—There are certain principles pertaining to the use of mercury, in the treatment of syphilis, which clinical experience has established as fixed and definite. Mercury should be given in moderate but efficacious doses, and not pushed beyond the production of its primary physiological effects. The production of salivation, and other toxic effects of large doses of the drug, is positively pernicious. Its influence upon the eruption, and the toleration of the patient's system, should be the measure of the dose. The two principal plans of administering mercury are known as the "tonic treatment" by the continuous use of small doses and the method of "intermittent treatments." In laying down rules for the treatment of syphilis, the most practical questions are: when should specific treatment be commenced; how should it be given; what should be its duration?

The proper time for beginning specific treatment is when the diagnosis is positively established. Since, in the large proportion of cases, the appearance of the eruption constitutes the necessary confirmation of the diagnosis, most authorities counsel delay until the appearance of secondary manifestations.

An undue importance has, perhaps, been assigned to the choice of the method of giving mercury. Its effects are much the same through whatever channel of entrance it is introduced into the system. The choice of the method should not be determined by rule or theory, but governed by indications furnished by the condition of the patient, the stage of his disease, and his morbid aptitudes. For example, a patient with dyspepsia, a weak, irritable stomach, or a tendency to diarrhea, should not be subjected to the ingestion of a drug which will still further derange his digestive functions.

Ingestion.—This is, perhaps, the most convenient method of giving mercury, and is commonly employed in this country, France, and England. It may be administered by the mouth in the form of a pill or mixture. The chief mercurial preparations employed are the protoiodide pills, each containing one centigramme (about one-sixth of a grain), from one to three of which may be given three times a day, after eating; Hydrargyrum cum creta, in tablet or pill form, one to two grains, three times a day. Dupuytren's pills and the ordinary blue pill, are also used in the treatment of syphilis. My own preference is for the protoiodide. If this preparation should be found objectionable on account of its tendency to produce gastro-intestinal derangement, it may be combined with opium; or some other preparation of mercury, such as the tannate or salicylate, may be substituted. Mercury may be given in solution, in combination with bitter infusions, or the tincture of iron. Among the standard preparations or solutions, the liquor of Van Swieten may be mentioned, or mercury combined with iodide in the syrup of Gibert, which is a favorite prescription in the Paris hospitals.

Inunction.—This is the oldest method of administering mercury in the treatment of syphilis. It still retains its popularity, especially in Germany, where it is regarded as the sovereign method. It consists in making frictions over different regions of the body with mercury or one of its salts combined with a fatty substance, as in the blue ointment, or some one of the numerous modifications which have been made of it. This method is serviceable in securing the rapid action of mercury. It has the decided disadvantage of uncleanliness, and of causing cutaneous irritations. The skin of many patients is so exceedingly sensitive to external irritation, that the inunction method in such cases is impracticable. Inunction finds its special application when we wish to secure the intensive action of the drug, in the case of children, of pregnant women, and in all cases where gastro-intestinal irritation is liable to follow its ingestion by the stomach. The technic used in inunctions is too well known to justify its description in detail.

Hypodermic Method.—This is a comparatively recent innovation upon older and established methods. It has the advantages of greater convenience, combined with scientific accuracy. It is also claimed that the action of the drug is more promptly curative when given hypodermically; that the maximum effect is obtained with a minimum dose; and that it rarely causes salivation, or irritation of the stomach or intestines.

Two classes of mercurial preparations are employed for subcutaneous injection: soluble injections, which are introduced every day or every other day, and are promptly eliminated; and insoluble injections, which are gradually absorbed and are given, on an average, once a week. The principal soluble preparations used are: the bichloride, the biniodide, the benzoate, and more recently, the cacodylate, the salicylo-arsenate, etc. The soluble injections are usually painful, and the necessity for their daily repetition renders them impracticable in most cases. The chief insoluble preparations are: the gray oil, calomel, and the salicylate of mercury. These are absorbed slowly, and only require repetition at several days' interval. The gray oil and calomel injections, although efficient, are apt to be painful, and not infrequently give rise to indurations, nodosities, and abscesses at the seat of puncture. No such objection applies to the intramuscular injection of the salicylate of mercury combined with benzoinol, in the proportion of twenty-four grains to the ounce. Injections of this preparation are comparatively painless, and seldom give rise to local irritation.

The site usually chosen for the intramuscular injections of mercury is the upper inner third of the buttock, since the surface of this region is little sensitive, and there are no vessels or nerves of importance to be avoided. The injections should be made with antiseptic precautions, and should be inserted deeply into the muscle, the buttocks being used alternately. The ordinary dose of the insoluble preparation would represent from three-fourths to one and a half grains of mercury. Intramuscular injections of mercury have a special value in severe lesions of the tertiary type, especially in cases where the patient has taken an insufficient mercurial treatment in the early stage. It often causes the disappearance of lesions which do not yield to iodide of potassium, or to the use of the drug given by the mouth.

The dermo-pulmonary method of fumigations of mercury is seldom employed in the ordinary treatment of syphilis. Intra-venous injections of mercury have not justified the claims of their originator. The serum-therapy of syphilis, whatever may be its future, has no scientific basis at the present day.

The iodide of potassium is the remedy *par excellence* for the tertiary manifestations of syphilis. It is also valuable in the early stage for the headache and osteocopic pains, and in the treatment of pustular lesions, which show a tendency to ulcerative action. The various tertiary affections of the bones, the gummato-ulcerous and specific lesions of the viscera and nerves, come within the range of its curative action. Iodide of potassium is not so toxic in its effects as mercury, and may be given with impunity. There is, however, a mistake on the part of many specialists, in giving enormous doses of iodide of potassium, as large as one-half to one ounce *per diem.* These massive doses are not necessary in order to develop the full therapeutic efficacy of the drug.

In resorting to mixed treatment, the biniodide of mercury is the preparation most generally employed in combination with iodide of potassium. When the latter is given alone, the most convenient mode of administration is in the form of a saturated solution. It may be associated with a bitter infusion, with a view of assisting digestion, or with various syrups to render it more palatable. An admirable combination is its admixture with the elixir of lacto-peptin, one to four.

The duration of the treatment of syphilis is usually from three to four years. Under certain conditions, complementary or supplemental treatments are given at intervals during five or six years, or longer.

While the value of this general scheme of treating syphilis has been established by experience, it is to be understood that no rules of treatment can be formulated which shall apply to all cases. The treatment of syphilis cannot be reduced to the terms of a mathematical formula—so many months of mercury followed by so many months of iodide of potassium. There is no class of diseases which so well illustrates the principle that uniformity of practice is not a good practice. The treatment must be modified and adapted to the quality or type of the disease. Many conditions relating to the constitution of the individual, his inherited or acquired predispositions, and his habits of life, must be taken into consideration. The indications are to treat the patient as well as the disease. Unfortunately, all men are not equal before syphilis. Common observation shows an immense difference in the character of syphilis in different individuals, in the multiplicity, severity, succession, and duration of its manifestations. While, in the majority of cases, active treatment during the secondary stage marks the definitive end of the disease, yet long-continued observation shows that active and prolonged treatment does not afford an absolute guarantee against tertiary manifestations. Independent of what are termed "factors of gravity" of syphilis, there are certain pathological predispositions which contribute toward the perpetuation of the syphilitic process in certain individuals. The neuropathic predisposition which comes from the hereditary make-up of the individual, or which may be acquired by weakening of the nervous system from overstrain, worry, or excesses and dissipation, constitute a powerful predisposing cause of nerve syphilis. Such individuals are predestined, so to speak, by virtue of their neurotic heritage, or acquired predisposition, to the serious dangers which come from syphilis of the nervous system. Such cases should be subjected to an anti-nervine as well as an anti-syphilitic treatment, and this treatment should be especially intensified at periods when the cerebral manifestations of the disease have their habitual development. Fournier is a strong advocate of the chronic intermitted method of treating syphilis. He believes that mercury acts as a sort of vaccine against the syphilitic virus, and that, like vaccination, its protective influence is exhausted or attenuated by time. He insists, therefore, that in certain types of cases, there should be a series of cures or repeated mercurial re-vaccinations, in order to suppress the tendency to these explosive accidents. And further, that these treatments should be approached as nearly as possible to the periods of the greatest imminence of nerve syphilis, that is, from the fifth to the tenth year.

In his latest brochure (" Pour en Guérir," Paris, 1907) Fournier declares that three conditions are necessary for the cure of syphilis, namely: (1) Good health, (2) good hygiene, and (3) good treatment. In all cases, the general health of the patient should be built up, and his power of resistance against the disease strengthened. In neuropathic individuals especially, the nervous system should be toned up, and all debilitating and depressing influences, such as nervous overstrain, excesses of all kinds, and alcoholic and venereal excesses particularly, should be avoided. These hygienic measures are of the highest possible value, and are scarcely subordinate in importance to specific treatment.

The hygiene of the mouth is of especial importance, even before specific treatment is begun. A systematic supervision of the mouth may be considered an absolute necessity during the entire course of mercurial treatment, not only with a view of preventing mercurial stomatitis, but also of preventing specific manifestations which are the direct result of local irritation. The irritating influence of tobacco upon the mucous membrane of the mouth and throat, as well as its depressing influence upon the vital functions, render it especially objectionable. Tobacco should be absolutely interdicted during the first year of the disease, and longer, if there is a tendency to localization of the disease in the mouth, in the shape of mucous patches or leucoplasia. The importance of this is emphasized by the consideration of the fact that leucoplasia is the almost habitual precursor of cancer of the tongue. In Fournier's statistics of one hundred and ten cases of lingual cancer, seen in private practice, one hundred and seven occurred in syphilitic smokers who were, for the most part, heavy smokers. He declares that syphilis alone does not produce cancer. It requires for its genesis a collaborator, and this collaborator is tobacco. The influence of alcohol in provoking and aggravating the manifestations of syphilis is too well known to require emphasis.

Local Treatment.—Experience with the dermic method has shown that mercury causes the lesions of syphilis to disappear more rapidly in the immediate vicinity of its application than upon remote parts of the body. The superficial and generalized eruptions of the secondary stage are usually promptly repressed by the internal use of mercury alone. When a papular eruption is situated upon an exposed part, as the nose or the face, its involution may be hastened by the use of ointment of ammoniated mercury or an ointment of the oleate of mercury, or a weak solution of bichloride in glycerin. The unsightly pigmentations upon the face and forehead, which often remain some time after the lesions have disappeared, clear up more rapidly under the influence of a bichloride lotion or ointment. Mucous patches of the mouth and throat disappear more readily under the influence of local treatment, than from the internal use of mercury. The patches may be touched with nitrate of silver, the solid stick, or in solution, or they may be painted with a solution of chromic acid, fifteen to forty grains to the ounce. For leucoplasia and other sclerotic conditions of the tongue and cheeks, the acid nitrate of mercury may be used with advantage.

Affections of the nasal mucous membranes are best treated by frequently cleansing the passages with Dobell's solution or other antiseptic douches; afterwards calomel or aristol may be thrown up by means of a powder projector. In the treatment of moist papules, and mucous patches of the integument, it is well to keep the surface well powdered with calomel and oxide of zinc and separated from contact by the interposition of dry lint or absorbent cotton. The condylomata about the scrotum or vulva, or around the anus, should be frequently cleansed with a weak Labarraque solution (for formula see Chap. XIII, p. 306). A powder of salicylic acid, 10 grains, boracic acid, 30 grains, and calomel, 1 drachm, will cause these lesions to rapidly melt away.

For the scaly eruptions upon the palms and soles, which are almost always characterized by obstinacy to constitutional treatment, white precipitate or blue ointment may be applied, often with good results. The diachylon plaster or the emplastrum hydrargyri, constitutes a most excellent application for the so-called "syphilitic psoriasis" of the palms and soles.

For the pustulo-crustaceous and ulcerous lesions, mercurial ointments or a mercurial plaster will be found serviceable. In the deep ulcerative lesions, which are especially apt to occur on the leg, strapping with the emplastrum de Vigo, and an occasional touching up of the indolent granulating surfaces with nitrate of silver, materially hastens the cure. The painful periosteal swellings and osteocopic pains may be relieved by painting with tincture of iodine or the application of mercurial plaster. When the joints are affected, counterirritants and immobilization are indicated. Often surgical intervention is required.

For syphilitic orchitis, a suspensory bandage to relieve the weight of the testicles, and frictions with oleate of mercury over the scrotum, give relief.

Treatment of Infantile Syphilis.—The treatment of infantile syphilis, whether hereditary or acquired, requires certain modifications in the treatment best adapted for adults. On account of its tendency to produce gastro-intestinal irritation, the internal administration of mercury is, as a rule, contraindicated. In some children the drug does not develop intestinal irritation, and it may be given in the form of mercury with chalk.

In the majority of cases, however, inunction with blue ointment, the oleate of mercury or mercurial baths, are used in the treatment of infantile syphilis. The inunctions may be made over different regions of the body, a different surface being selected for each application. A convenient method of inunction is by smearing the child's flannel band with blue ointment. The movements of the child will be sufficient to cause its absorption.

On account of the delicacy of the child's skin, syphilitic lesions are apt to assume the moist form. The child should be frequently bathed, and the lesions dusted with protective powders. Mercurial baths, prepared by the addition of a weak alcoholic solution of the sublimate to the ordinary bath, with or without chloride of ammonium, is a cleanly and convenient method of employing mercury. The existence of large abraded or ulcerated surfaces would constitute a contraindication. Many authorities recommend subcutaneous injections of mercury in the treatment of infantile syphilis.

For the vegetating condylomata around the genitalia and anus, dusting with equal parts of oxide of zinc and calomel constitutes the most efficient local treatment.

The treatment of hereditary syphilis by the administration of specific treatment to the mother or wet-nurse during the period of lactation is of doubtful value. It is questionable whether the milk is materially modified by the action of mercury or whether the mercurialized milk of the mother exercises a curative influence upon the syphilis of the child. Iodide of potassium finds its special application in the treatment of the late or tardy manifestations of hereditary syphilis which develop at the period of second dentition, of early adolescence, or later.

SYPHILIS AND MARRIAGE.

Two fundamental characters, contagiousness and susceptibility of hereditary transmission, give to syphilis an altogether special importance in relation to marriage. The statement has been made that syphilis constitutes a far greater danger to society and the race than to the individual. The chief significance of syphilis as a racial danger comes from its hereditary effects. The vast array of morbid phenomena, dystrophies, and degenerations, which make up the pathology of hereditary syphilis has its chief source in marriage. In addition, hereditary syphilis undoubtedly creates a terrain or soil favorable for the reception and germination of tubercle bacilli and perhaps other bacilli. It does this by impoverishing the organism and diminishing the capacity of resistance against microbic invasion.

Syphilis is the only disease transmitted in full virulence to the offspring, killing them outright or blighting their normal development. From the viewpoint of race perpetuation syphilis is antagonistic to all that the family represents in our social system. The social aim of marriage is not simply the procreation of children, but of children born in conditions of vitality, health, and physical vigor. The effect of syphilis is to so vitiate the procreative process as to produce abortions, or else a race of inferior beings, endowed with defects and infirmities and unfit for the struggle of life. It is this pernicious effect of syphilis upon the offspring which gives to the disease a dominant influence as a factor in the degeneration and depopulation of the race.

Apart from its hereditary risks, the important relations of syphilis with marriage are emphasized by its quality of contagiousness. Owing to its multitudinous modes of contagion, syphilis, introduced into marriage, often becomes the origin of numerous innocent infections which are communicated in the ordinary relations of family and social life.

There is no department of preventive medicine which is more important or yields results of higher value to the welfare of the family and society than the safeguarding of marriage from syphilitic infection. The sanitary office of the physician is: (1) To prevent the introduction of syphilis into marriage; (2) when syphilis has already been introduced, to circumscribe or limit its effects. The intelligent exercise of this protective duty demands not only professional knowledge, but wisdom, tact, and experience, especially in dealing with the numerous and complicated situations which are created by the introduction of syphilis into marriage.

Before Marriage.—There are certain practical questions which have an important bearing upon the intelligent discharge of the responsible duty of shielding the innocent from infection.

Should the syphilitic man marry? That most men have some conception of the contagious and hereditary influence of the disease, is evident from the question so frequently propounded to the physician by the man who has contracted syphilis—Can I marry and have healthy children?

To this question the physician is justified, in the large proportion of cases, in giving a reassuring response, exception being made of a class of cases presently to be referred to, in which the individual is incapacitated for marriage by reason of his own personal risks from the disease. Observation shows most conclusively that after a certain period of probation, during which he has been subjected to active treatment, the syphilitic man may marry and not infect his wife, and beget children who remain free from any sign of syphilitic taint. There is no fact better established than that the contagious and transmissive power of syphilis may be extinguished by time and treatment.

To the next question which frequently follows the first—When or how soon can I marry?—the response is not so direct or positive. It may be laid down as a cardinal principle, which must serve as the criterion of the physician's advice in all cases, that no syphilitic should marry so long as he is capable of infecting his wife or transmitting the disease to his offspring. While the contagious stage of syphilis is not the exact measure of the duration of its hereditary influence, there is a certain concordance between the two periods. A syphilitic husband who has no contagious lesions on his person may be dangerous to his wife through conceptional syphilis.

Certain facts of our knowledge bearing upon the duration of this period may be summarized as a basis for the physician's judgment: (1) The duration of the period of the contagious and transmissive power of syphilis does not admit of mathematical expression. It varies in different cases. (2) The type of the disease, the constitutional peculiarities of the patient, the presence or absence of certain conditions which are recognized as factors of gravity in syphilis, and especially the treatment employed, all exert a modifying influence. (3) All these elements should be taken into consideration in deciding upon the admissibility of a syphilitic man to marriage; each case should be studied upon its individual merits. (4) The advanced age of the diathesis, a prolonged immunity from specific manifestations, and sufficient specific treatment are the surest guarantees of safety.

It may be positively affirmed that the chronological completion of the secondary stage does not mark the limit of its contagious activity, as formerly supposed. There are well-authenticated observations which prove in the most positive manner that the late lesions of syphilis, occurring five, six, or ten years later, may exceptionally be sources of contagion. Fournier has recently reported a case of contagion of the wife occurring in the seventeenth year from a mucous patch in the mouth of the husband. The advice of certain authorities, notably Hutchinson, that "if treatment has been continued from two to two and a half years from the date of the chancre a man may safely marry," is medically a mistake, and socially a danger.

Unfortunately, in the present state of our knowledge, there is no scientifically accurate means of determining the precise date which marks the definite disappearance of the virulent principle. If the spirocheta pallida be proven to be the causal agent of syphilis, it is possible that improved methods of technic will enable us to positively determine the presence or absence of these organisms in the body.

In the absence of any trustworthy test, reliance must be placed upon the facts of experience and observation. A careful interpretation of these facts shows that in the immense majority of cases the contagious activity of syphilis and its hereditary transmissibility are not manifest after the fourth year. It may therefore be concluded that when the syphilitic diathesis has been subjected to the double depurative action of time and treatment during a period of four years, and there has been an exemption from all manifestations during the last twelve or eighteen months, it is scientifically safe for the syphilitic to marry. This, however, is not a formula based upon mathematical certainty, but rather upon a calculation of probabilities.

In cases where active manifestations of the disease still continue to recur after this period, especially when they consist of lesions of the mucous membranes, marriage cannot be sanctioned with safety. Observation shows that recurrent mucous patches of the mouth are the almost exclusive source of late contaminations in marriage.

Even after the dangers of syphilis, from the standpoint of its contagiousness and transmissibility by inheritance, have been silenced by time and treatment, a syphilitic man may be incapacitated for marriage by reason of his personal risks from the disease. Unfortunately, syphilis often yields a late harvest of tabes, general paralysis, and other lesions of the general nervous system—affections for the most part disabling and incurable—which may ruin the patient's health and entirely incapacitate him for the responsible position of the head and support of a family. The existence of such conditions constitutes an express permanent contraindication to marriage.

Of all menaces to the health and life of the individual, lesions of the nerve centres are most common and most to be feared, and it is within the sphere of the nervous system that we must look for indications which point to a menacing character of the diathesis. In persons of neuropathic constitution, especially, the determination of syphilis toward the nerve centres, the eyes, and the organs of special sense always carries a grave prognostic significance, and in such cases the period of probation should be lengthened until there has been a prolonged exemption from all evidences of implication of the nervous system.

The consideration of this subject would be incomplete without reference to the result of the physician's advice in counselling the postponement of marriage of a syphilitic until time and treatment render such a step safe.

In the majority of cases the individual who consults the physician in regard to his fitness for marriage, does so with the honest intention of accepting and abiding by his counsel. However prolonged the probationary period, he conforms to the conditions imposed. Unfortunately, there are many cases where for reasons personal to himself—it may be financial or other considerations—the patient, although fully instructed as to the danger to his prospective wife, and the practical certainty of infecting her, nevertheless refuses to postpone his marriage. He prefers to take the chances—or rather subject his wife to the chances—of infection. Does the physician fulfill his entire duty in simply refusing to sanction the marriage?

In this connection it may be said that the view is held by certain writers that the sanction of marriage does not properly come within the physician's province. In the most recent English text-book on Syphilology, the author gives expression to his view as follows: "Is it any business of the medical man to give his sanction to marriage at all? Marriage is a civil contract, concerned chiefly with matters other than medical. The duty of the medical man ends with pointing out to his patient the possible eventualities in case of marriage." In other words, the poisoning of an innocent woman with syphilis is a matter between husband and wife with which the physician has nothing to do. This view seems subversive of the high ideals of preventive medicine. It is the recognized duty of a physician in the presence of any contagious disease to protect others from the risks of infection. In the case of diphtheria, smallpox, or any infectious disease, the physician may discharge this duty by notifying the health authorities, who take proper precautions to protect others from the spread of the disease. In the case of syphilis, where there is a question of its introduction into marriage, the physician's protective duty embraces not only the prospective wife, but the children she may bring into the world, and through them the interests of society. Unfortunately, syphilis is without the pale of prevention or even recognition by the official authorities, and the physician stands as the only protector of the interests of the future family. The question is whether his socio-sanitary duty to preserve others from infection falls below his duty to protect his patient in infecting them. The answer to this question trenches upon the domain of professional ethics. In the solution of this problem, where the physician is confronted with a divided duty, common sense, as well as humanity and conscience, should be invoked.

The medical secret in relation to professional conduct is too complicated and delicate to be properly considered within the necessarily restricted limits of this article. In Prince Morrow's work ("Social Diseases and Marriage") the question is discussed in all its bearings and with especial reference to the case of a syphilitic man, who, despite the warning of his physician, proposes to carry out his intention to marry, with the practical certainty of infecting his wife. One quotation may be permitted, which applies to this class of cases:

"While the obligation of the medical secret is in the general interest of the social order and should be maintained as a fixed principle of professional conduct, it may be admitted that a situation of a peculiarly aggravating character may present itself where the patient shows himself an exceptional sort of brute by the obstinacy with which he adheres to his criminal purpose after he is assured that he will almost certainly infect his wife—in such a case the physician, knowing all the circumstances and fully appreciating the tragic significance of such a step, must be guided by his own lights and conscience. If he should consider the criminal intent of this man as entirely without the pale of professional protection and refuse to stifle his own feelings as a man of heart and conscience, who shall condemn him? Such a physician is far more likely to prove loyal to the highest ideals of ethical duty in his relations with his patients in general, than the one who views these social catastrophes with a cold-blooded indifference, disclaiming all personal responsibility, and considers that in guarding the dissolute secret of his patient he is doing his whole professional duty."

After Marriage.—While it is the duty of the physician to employ any justifiable means to prevent the premature marriage of a syphilitic patient, yet it most often happens that he is not consulted until after the disease has been introduced into the family.

The husband may have contracted syphilis at a more or less remote period before marriage, or he may have contracted the disease *post nuptias.*

The situations created by the introduction of syphilis into marriage are varied and complicated, and render the physician's task most difficult and delicate. The husband may be syphilitic and the wife uncontaminated, the wife may be contaminated and also pregnant.

When a married man has syphilis, the first indication is to prevent contamination of his wife, the second is to guard against pregnancy. He should be treated actively and energetically, with a view of suppressing as promptly as possible all sources of contagion. The interdiction of pregnancy should be absolute, until time and treatment have exerted an attenuating and corrective influence upon the diathesis.

If the wife has become infected and pregnancy has taken place, she should be most energetically treated during the greater part of the period of her pregnancy. Specific treatment, judiciously employed, does not tend to produce abortion. When the pregnancy results in a child living, but syphilitic, it should always be nursed by the mother, even though she may have apparently escaped the contagion in carrying it. It is a law of syphilis, first formulated by Colles, that a child, syphilitic from birth, never communicates the disease to its nursing mother.

The saddest feature of conjugal infection is that the wife rarely receives the benefit of prompt and efficient treatment. In practice it will be found difficult to treat a woman during the prolonged period necessary to cure the disease and conceal from her the nature of her trouble. If the husband can be persuaded to avow the nature of his disease, the situation is simplified and there may be an intelligent coöperation on the part of both with the physician in avoiding the deplorable results which come from transmission of the disease to the offspring. Incredible as it may appear, many husbands employ every possible means to prevent their wives from consulting a physician from the fear of the exposure of their own infidelity, which must come from the wife's knowledge of the nature of her disease.

It is not to be assumed that all husbands who infect their wives with syphilis are of this class. Many of them are overwhelmed with regret and remorse, and are anxious that the wife should receive the most thorough treatment possible. Under these circumstances, where a syphilitic patient calls in the physician to attend his wife, the important question comes up whether the wife should be informed by her physician of the nature of her disease? The fixed rule of professional conduct in these cases, from which there should be no deviation, is that no information, nor hint even, of the nature of the disease, should come from the physician. It matters not what may be the feelings of indignation or disgust he may entertain for the man, he must zealously guard the secret of the patient. The harm has been done and cannot be undone. The main indication is to limit its ill effects.

PROPHYLAXIS THROUGH EDUCATION.

It is a lamentable fact that the vast mass of disease and misery engendered by the introduction of syphilis into marriage, through the infection of the wife, with all its train of hereditary horrors, has its origin in the voluntary act of the husband and father. It would appear almost incredible that a man would voluntarily expose the woman he has vowed to cherish and protect to the risks of an infection which not only endangers her health, but poisons the very sources of the life of his children. And yet observation shows that syphilitic infections in married life are by no means rare; on the contrary, they are frequent, much more frequent than is commonly supposed. They occur in every class and rank of society, not only among the poor and ignorant, but among the intelligent and well to do.

Statistics embracing all classes of women show that of women infected with syphilis, twenty per cent, or one in every five, is contaminated by her husband. Excluding the abandoned or vicious class, practically all women who acquire syphilis receive the infection from their husbands.

The only extenuating feature of these social crimes is that while infections in marriage are voluntary, they are for the most part ignorant infections. The opinion of those who have had large experience in dealing with marital syphilis is concurrent upon this point: the basic cause is ignorance. The man who carries disease and death into his family most often does so because he does not know its terrible consequences to his wife and children; he does not know its modes of contagion, nor the duration of its transmissive capacity. Few men, even among what are termed the educated classes, have any correct knowledge of the most common sources of syphilitic contagion. They do not know that in the large proportion of cases contagion is affected through the medium of mucous patches.

In the popular conception genital sores are the only source of contagion and when the chancre heals there is no danger of infection. This belief is not surprising in view of the fact that fifty years ago Ricord's doctrine, "the contagion of syphilis begins and ends with the chancre," was generally accepted by the medical profession.

In this connection it may be said that almost all popular errors about syphilis are but the discarded opinions of the medical profession, such for example as "syphilis is readily cured and there's an end of it." "A few months' treatment is sufficient for a cure." "After two years, or at the most two and a half years, it is perfectly safe for a syphilitic man to marry," etc.

The recognition of the chief cause of marital syphilis suggests the logical remedy—Education; that is to say, a general enlightenment of the public respecting the dangers of syphilis to the individual and to society, as well as its modes of contagion, direct and indirect. It may be said that individual enlightenment may now be had by the syphilitic patient consulting his physician. While the sanitary office of the physician in safeguarding marriage from syphilis is of the highest importance, yet it must be admitted that its preventive value is comparatively restricted, as, unfortunately, considerations of health rarely enter into men's matrimonial schemes. Only a small percentage of syphilitic men consult a physician as to their fitness for marriage and parentage. Among the well-to-do classes the advice of the physician is sometimes sought as to the propriety or safety of marriage, but among the poorer classes the physician is rarely consulted. Then again, the physician is not armed with authority to enforce the conditions his judgment may impose; his only weapons are enlightenment and persuasion. While it may be comparatively easy to persuade a syphilitic man whose marriage is a dream of the future to relinquish all idea of its fulfillment until he is no longer dangerous to his prospective wife and children, yet in practice the situation presented is often quite different. The physician is not consulted until after an engagement is entered into, possibly the date fixed and all arrangements for the marriage completed.

A by no means inconsiderable experience has convinced me that the intervention of the physician in this class of cases is practically hopeless. The patient, though fully enlightened as to the possible and even probable dangers of a premature marriage, can find no easy way of retreat. A postponement of the marriage during the necessary period of probation and treatment is often equivalent to a rupture of the engagement. Often he can give no explanation without the humiliating alternative of avowing the true cause. In most cases he marries at the time appointed, and his wife and children suffer the consequences of his criminal folly.

It is evident that enlightenment, to be efficient as a prophylactic, must be timely; that is to say, it must be given before the nearness of marriage enters as a complicating factor in the situation.

All these facts emphasize the especial importance of educating the rising generation of young men, those who are destined as future husbands and fathers to continue the race. Practically all young men include marriage at a more or less remote future in their scheme of life. Every young man should know that the contraction of syphilis may not only seriously compromise his own health, but lead to a forfeiture of all those hopes and aspirations which find their fruition in a safe, honorable, and fruitful marriage. A knowledge of these facts should be so universal that no man who aspires to marriage, whatever his degree of intelligence or station in life, should be ignorant of the danger and criminality of carrying syphilitic infection into his family.

It may be observed in conclusion that this education should begin in the ranks of the medical profession. Many physicians have not kept pace with the advances made in our knowledge of syphilis which especially emphasizes its social dangers and the importance of prophylaxis. In our college curricula this phase of preventive medicine is rarely touched upon, and in our text books on syphilis its important relations with marriage receive brief and entirely inadequate consideration.

In the writer's experience quite a number of syphilitic men who have married prematurely and infected their wives have declared that their marriage was sanctioned by a physician. Without lending a too credulous ear to statements designed to shift responsibility to the shoulders of another, there is reason to believe that many physicians are too lax and indulgent to the wishes and inclinations of their patients. They are disposed to view the matter from the standpoint of the interested party and impose only the minimum of delay. Many physicians still hold the dangerous view that a syphilitic man may safely marry after two and a half years, irrespective of the character of the diathesis or the treatment employed.

The practical question remains, how and through what agencies can this prophylactic education be imparted to the public? A detailed consideration of "ways and means" cannot be entered into here. Reference may be made to the campaign of education recently inaugurated in this country by a Society organized for this purpose. The educational policy of this Society embraces in its objects two essential features, "Publicity of evils which have always been covered up and concealed," and "Sex instruction."

Education of the rising generation in a knowledge of the origin of life, the physiology and hygiene of sex, and the dangers both physical and moral, which come from the irregular exercise of the sex function, will, it is believed, tend to promote clean living and thus secure the ideal prophylaxis which is to prevent the contraction of disease which unfits a man for marriage.

It is also believed that exposure of the dangers to the family and society which come from the introduction of syphilis into marriage will create a healthy, humane public sentiment which will no longer tolerate the crowning evil of our social life—the infection of virtuous wives and innocent children.

CHAPTER XVIII.

ABORTION.

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DEFINITION.

THE expulsion of the ovum from the uterus before the sixteenth week of pregnancy is called by American obstetricians, abortion; from that time to the twenty-eighth it is commonly known as a miscarriage (*partus immaturus* of the Germans); and from the twenty-eighth week to the fortieth, a premature delivery (*partus prematurus*). A distinction between the first and second conditions may seem arbitrary and artificial, but there is reason for it in the changes from the chorion to the placenta and in the difference in the mechanism of expulsion of the uterine contents. In the consideration of abortion the fetus plays but a small part, while the secundines (chorion, amnion, and decidua) are of the greatest importance; in the case of premature delivery and delivery at term the relative importance of the two things is reversed.

HISTORY.

The history of abortion reaches back to the oldest writers. Celsus truly attributes many cases of abortion to dysentery, and says: "when dysentery is accompanied with fever the woman usually dies." I have often been astonished at the close observation of the ancients in regard to abortion. The fact that it is more dangerous than birth at full term was fully recognized by them, and Hippocrates notes the frequency with which some women abort repeatedly at the same month (Haeser's "Geschichte der Medicin," 1875). Their views on the subject were so correct that it is a matter of surprise to find they did not regard the induction of abortion in the early months as a criminal offence. In this respect, however, they are only in accord with the views prevailing to-day, for it is a common impression, even among educated persons, that so long as no life can be recognized there can be nothing wrong in causing abortion; an idea which it behooves us to do all in our power to eradicate.

FREQUENCY.

No accurate statistics in regard to the frequency with which abortion takes place can be obtained; the best which can be done is to draw what conclusions are possible from our case-books, although we at once encounter a stumbling-block in the fact that in these we have to do with sick women. An analysis of eleven hundred and one cases, taken from the case-books of Dr. Edward J. Ill, of New Jersey, shows that out of this number there had been six hundred and sixty-three who had had more than one child; three hundred and fifty-four who had had only one child; and eighty-four who had had abortions only. Among the six hundred and sixty-three multiparæ there had been four hundred and eighty-five abortions, which amounts to about one abortion to every five pregnancies. Among the primiparæ, that is, women who had had but one child, there had been one hundred and forty abortions, that is, about one abortion to every two and five-tenths pregnancies; while the remaining eighty-four women, who had never carried a child beyond the fourth month, had had one hundred and three abortions. The large proportion of abortions in the primiparæ may be accounted for by the fact that their labors were, in many cases, severe. These figures are not in harmony with those of some other observers, but it must be remembered that these women were affected with some pelvic lesion and were thus more subject to spontaneous abortion.

These figures show how uncertain such statements must always be, and that in order to get accurate statistics they must be taken, after the menopause, from a large number of women. All that can be said on the subject is that a consultation of the works of most authorities shows them to agree that the frequency of abortion to birth at full term is from one in five or six to one in ten, and that the third month is the time when it most frequently takes place. It seems also to be generally agreed that as women grow older they are more subject to abortion, which is what would naturally be expected, as the pelvic organs become more subject to pathological changes as life advances. Stumpff gives the following figures on this point (*Münch. med. Wochenschr.*, 1892, Nos. 43 and 44):

	Per cent
Before the age of 21 years	23.6
From 21–25 years	22.5
“ 26 30 “	31.0
“ 31 35 “	27.1
“ 36 40 “	27.5
Above 40 “	36.6

It is a matter of common opinion that abortions are most apt to occur at times when the patient would naturally expect a return of her menses. Contractions of the uterus, induced by the customary ovarian stimulation, may be the cause of abortions at these times; or the death of the fetus may excite renewed activity of the ovary. I have sometimes observed that an exceptionally large number of abortions occur midway between two expected periods, for example, at six or at ten weeks.

ETIOLOGY.

There are always more cases of abortion among multiparæ than primiparæ, but this is simply because multiparæ are in the majority and also because they are more subject to uterine derangements. The causes of spontaneous abortion must be looked for in both mother and child, but a study of a number of such cases shows that mechanical and psychical influences are much less frequently concerned in their etiology than true pathological conditions of either the ovum or the parental organism. The term habitual abortion is much used, but it does little toward an understanding of either the pathology or the causation of the condition.

Causes of Abortion Due to the Ovum.—Many observers have noticed the occurrence of various malformations and changes in the normal growth of the ovum as a cause of abortion. As far back as 1839, Allen Thomson (*Edin. Med. and Surg. Jour.*, 1839) called attention to the presence of adhesions between the back of the fetus and the membranes. The origin of such malformations is not known. Some observers have attributed them to the spermatozoa, especially in chronic alcoholism, but how far this is really in action as a cause is difficult to say.

The primary death of the fetus may be induced by imperfect vascularization of the amnion. Hemorrhages into the chorion caused by trauma are said to be the occasion of some of the deformities of the fetus, as well as adhesion of the fetus to the amnion. Hydramnion in early pregnancy is more likely to be the result of the dead fetus than the cause (L. Seitz, v. Winkel's "Handbuch der Geburtshülfe"). Hegar ("Beiträge," 1902, Band 6, Hft. 2), in a study of twenty-four abortions, found that in eleven there was primarily disease of the fetal membrane, the degeneration beginning in the chorion. Bar (Frommel's "Jahresbericht," 1903) has shown that a faulty insertion of the ovum into the horn of the uterus may give rise to premature uterine contractions and consequent expulsion of the product of conception. Again, a low insertion of the ovum, leading to placenta prævia, is sometimes a factor in abortion. Hemorrhage into the chorion, and between the chorion and the decidua, commonly known as "molar pregnancy," is a common cause of death of the fetus; in such cases it rapidly disappears, as if by absorption, leaving the amnion as a small bag containing a little clear or slightly blood-stained fluid. It is most commonly in these cases that we meet with the so-called "missed abortions," a condition where the product of conception remains *in utero* for weeks, or even months, without any evident symptoms. Now and then a hydatidaform degeneration of the chorion results in abortion, and this condition was well known to the ancients. The fetus may also die from infection, without any disease of the mother; one case has been reported in which the fetus had smallpox, while the mother remained well (S. Chasan). Rare cases have been described of abortion in twins in which one ovum was expelled while the other continued its growth.

Causes of Abortion Due to the Mother.—Various infections of the mother may cause death of the fetus. According to Charpentier (*Centrbl. f. Gyn.*, 1898, vol. 22, p. 198) measles was the cause of abortion twenty-three times in fifty-one cases. Scarlet fever, smallpox, typhoid-fever, pneumonia, erysipelas, appendicitis, and other febrile disorders are frequent causes, and the fact that abortions occur most frequently in them when the temperature is high, shows a relation between its occurrence and the severity of the disease. As regards the chronic infections, abortions have been attributed to tuberculosis in the mother in a few cases (Birch-Hirschfeld).

Syphilis has always played a large part as a causative factor in abortion, but while there is no doubt as to its influence as a cause of premature labor, its share in the etiology of abortion is more difficult to determine, because of the absence of definite syphilitic lesions of the ovum or fetus before the sixteenth week. L. Seitz (v. Winkel's "Geburtshülfe") attributed five abortions in one hundred and nine cases of pregnant syphilitics, or four and one-fourteenth per cent, to the influence of the syphilitic poison. Other authorities give syphilis as the cause of abortion in from four and three-tenths per cent to twenty-five per cent. Seitz, after a thorough sifting of the question, insists that the more recent the infection the more likely is there to be an early termination of the pregnancy. Syphilis has for a long time had the reputation of inducing recurrent abortions. I might, however, state that I have never but once been able to control recurring abortions by means of any syphilitic treatment. In the single case the patient, who was known to be syphilitic, aborted six times, and then after five months anti-syphilitic treatment gave birth to a living and healthy child (*Med. Rec.,* Oct. 6, 1894).

Circulatory disturbances, induced by the various heart lesions, are a fruitful source of abortion, by the production of hemorrhages behind and into the decidua.

The part played by trauma in the causation of abortion is difficult to decide in any given case. A most careful examination of the uterine contents, placenta, chorion, and fetus is imperative before an opinion can be formed. If shortly after the occurrence of trauma an abortion occurs in which there is an old degeneration of the decidua with small-celled infiltration, atrophy of the chorionic villi (Oliver, *Brit. Med. Jour.*, Feb. 15, 1902), hemorrhages undergoing some organization, or maceration of the ovum, it may be confidently stated that the traumatic influence is not concerned in the abortion (Hegar, "Der Abort.," 1902). From a medico-legal point of view the question of trauma is of great importance.

Psychic disturbances and excessive cohabitation, especially when the latter takes place at a time when menstruation might otherwise be expected, are frequent causes of abortion.

Acute poisoning by means of alcohol (Drappier, Frommel's "Jahresbericht," 1896), phosphorus, lead and other poisons is a factor in abortion. It is also important to remember that certain drugs, such as aloes, senna, and other purgatives may induce abortion with sensitive patients, though, fortunately, only when administered in excessive doses. Cotton-root, a popular remedy in the South, has the reputation of being responsible for causing abortions, as well as savine, tansy, and oil of pennyroyal; the two last are said to be less efficient than the others. The effect of cotton-root upon the muscular contractions of the uterus is apparent in many cases of uterine myomata where the main symptom is an excessive flow, when it is given for several days before menstruation appears, and kept up while it lasts. Iron also has been known to cause uterine contractions.

Certain diseases of the genital organs are a prolific cause of abortion, especially endometritis, more commonly in the hyperplastic and hemorrhagic forms. Not infrequently a chronic metritis (really hyperplasia of the inter-muscular cellular tissue), coupled always with an endometritis, may be looked for as a causative factor. The same thing can be said of retroversions and retroflexions of the uterus, with their accompanying endometric changes.

The various forms of decidual inflammation, gland hypertrophy, general diffuse hypertrophy, and polypoid thickening, are believed to be causal factors (Hurdon, "Gynecology and Abdominal Surgery," Kelly and Noble, vol. 1, 1907). Inflammatory changes in the decidua are probably a more frequent cause than is commonly suspected.

Injury to the cervix has been shown by T. A. Emmet ("Principles and Practice of Gynecology," 1884) to be a frequent cause of early interruption of pregnancy, though he makes no distinction between miscarriages and abortions. Olshausen ("Klin. Beiträge f. Geburtshülfe und Gynäkologie," Feb., 1884) has drawn attention to the same fact. A patient of mine once had fourteen abortions in succession, and then, after an operation for deep laceration of the cervix, became the mother of a living child. Amputations of the cervix are not, in my own opinion, the cause of abortion to any great extent.

Abortions at the fifteenth or sixteenth week are often due to retroflexion and retroversion. Prolapse of the uterus and pelvic adhesions are factors in producing premature contractions of the uterus. Abortions are sometimes due to shortened and sensitive utero-sacral ligaments and indurations in the base of the broad ligament. In these cases several successive abortions have occurred, the patient going longer with each pregnancy; the pregnancies were accompanied by pain in the affected side. Similar cases have been reported by Kleinwächter (*Zeitschr. f. Geb. u. Gyn.*, 1903, vol. 49, p. 1). I have never yet seen an abortion in a myomatous uterus, though it is reported to be moderately frequent.

Disease of the adnexa is reported to be a cause of abortion, by leading to pelvic adhesions, and also a lack of development of the uterus.

Operative procedures during pregnancy are quite frequently a source of trouble, though ovarian tumors, and even pedunculate and sessile myomata, have been removed without interfering with its progress. I once removed a sessile myoma weighing sixteen pounds from a uterus five months pregnant without injuring the product of conception; the patient went to full term. Even lacerations of the cervix have been operated upon without untoward result. It is well known, however, that operations on the cervix, the vagina, the external genitalia, and the breasts are peculiarly apt to excite the uterus to contraction; and experience has shown that from twenty to thirty per cent of cases operated upon during pregnancy abort.

MECHANISM OF ABORTION.

The mechanism of abortion is somewhat different from that of miscarriage, the conditions treating mainly of secundines and the fetus playing a less important part. It is worthy of a careful study, for a knowledge of it is of great assistance in the treatment.

An accumulation of blood between the decidua vera and the uterine wall sometimes occurs, and when this hemorrhage is slight, it produces no contractions of the uterus nor disturbance of the circulation of the fetus, and the pregnancy may possibly go on to term. If, however, contractions of the uterus occur, the entire ovum is forced into the cervical canal, dilating it until the two cavities are converted into one. In such cases the patient has usually a slight flow before the uterine contractions are felt. This is the common, it might be said the normal, mechanism of an abortion, as all membranes are cast off with the egg and the uterus remains in the best shape for a regeneration of its mucous membrane and involution of its muscular apparatus. If, however, the decidua serotina is adherent, the decidua vera is drawn back over the ovum as it is expelled from the uterus, and appears as a long cord which may be replaced over the ovum. When, owing to violent uterine contractions, the decidua breaks, the ovum with its shaggy chorion may be expelled into the vagina and the decidua follows later, if at all.

Some good authorities assert that the decidua may remain, either wholly or in part, and regenerate to a normal mucosa. Others maintain that retention is fraught with danger to the patient and occasions endometric changes. Retention of the decidua, unless it becomes saprophytic, septic, or hemorrhagic, rarely produces any trouble and it commonly regenerates into a normal mucous membrane; at all events the danger of retention of the decidua has been much overrated.

It sometimes happens that the whole product of conception is expelled from the uterine cavity into the cavity of the cervix, dilating the latter sufficiently to accommodate it, but failing to dilate the os. In such a case the examining finger finds the cervix balloon-like, with an extremely small os, usually easily dilated, and cleans it out with a sweep. This condition was formerly misunderstood, and led to the erroneous belief that the ovum might become attached to the cervical mucous membrane (Rokitansky, *Monatsschr. f. Geburtsk. u. Frauenkr.*, 1861, vol. 17). In certain other cases the os is widely dilated, but the whole product of conception remains in the cervical canal, because the uterine contractions fail to expel it, and under these circumstances also it can be cleaned out with a sweep of the finger. Occasionally, however, the uterine contractions force everything into the vagina.

SYMPTOMS AND DIAGNOSIS.

The symptoms of abortion cannot be considered alone, but must be treated in connection with the question of diagnosis.

The diagnosis of abortion rests, first of all, upon the diagnosis of uterine pregnancy. The diagnosis of early pregnancy is by no means always easy, and it may require close inquiry into the history as well as careful manual examination of the pelvic organs (see Chap. VI, Fig. 59). The diagnosis is most difficult in multiparæ, because the physician may be dealing with a pathological increase in the size of the uterus. The diagnosis of pregnancy being made, the next step is to look for symptoms of abortion, the most prominent and constant of which is a bloody discharge from the uterus. It is important for the physician to assure himself that the flow actually comes from the uterine cavity and not from injuries or diseases of the vagina. As I have said, this flow proceeds from a separation of the decidua from the uterine wall, although in rare instances it may come from the mucous surface of the decidua, and when this is the case abortion is not likely to occur. The etiology of abortion should be considered in the diagnosis, and the possibility of willful interference and its character should not be lost sight of, for the prognosis may depend on this.

The most important symptoms of a threatened or imminent abortion are a slight flow of blood after a cessation of the menses and a sense of uneasiness in the pelvis. These may subside under proper care and treatment and the pregnancy go on to full term, a fact which must be carefully borne in mind in every case of abortion. When, however, the bleeding continues and the uterine contractions increase in severity, accompanied with pain in the back and over the pubes, with a frequent desire to urinate, abortion will certainly occur. A threatened abortion is most apt to be confounded with the beginning rupture of a tubal pregnancy. Here also we have more or less of a flow of blood after a cessation of menstruation, besides acute pelvic pain, often simulating menstrual pain. An error in diagnosis between these two conditions is liable to be followed by the most serious consequences, and in these days of indiscriminate curetting especially, it must be guarded against.

A flow of blood and uterine contractions may be present with an intrauterine polyp and simulate abortion. The history of previous attacks of the kind, the unlikelihood of a cessation of menstruation, and the absence of all symptoms of pregnancy should point in the proper direction. Occasionally cases occur where normal cessation of menstruation has existed during lactation, and the first symptom of pregnancy is a flow of blood and an imminent abortion.

Whenever a patient has missed one or more monthly periods and has a show of blood, our suspicions must be directed to the possibility of abortion. It is always wise to suspect every woman of being pregnant until the contrary is established in order to prevent calamities. For a patient may consult a physician in perfect ignorance of her condition, or she may intentionally mislead him, in the hope that a pelvic examination will induce an abortion.

Occasionally, a case occurs in which it is difficult to say whether the physician is dealing with an abortion or with its after effects. When most of the secundines have been retained, the uterus may still seem large and flabby; the great softness of the supra-vaginal portion may remain and suggest that pregnancy continues. If, however, the uterus can be felt to contract under the examining finger, that is to say by bimanual palpation, it is certain that most of the product of conception has been expelled, and probably quite recently. In a later stage this sign no longer holds good, and it may be impossible to make a diagnosis without a microscopical examination. The size of the uterus as compared with the time of probable pregnancy should always be considered most carefully.

When the diagnosis of imminent abortion is decided upon, the physician's first duty is to determine whether the abortion is or is not inevitable. It is inevitable when regular uterine contractions take place and when parts of the product of conception have been expelled. It is rare for a pregnancy to continue when the ovum can be felt through a dilated canal. Sometimes a sudden cessation of the gastric symptoms of pregnancy indicates death of the fetus, and should be considered in the physician's opinion. Finally, it must be ascertained whether the uterus has entirely expelled its contents, or whether there are still remnants of the product of conception; in other words, whether there is an incomplete abortion. It is wise to proceed slowly and carefully in the formation of an opinion upon this point. When there is a gradual diminution of the flow, and a cessation of pain, the abortion is probably complete; when the flow continues with occasional exacerbations it may be assumed that pieces of the decidua are still *in utero*. It is well, however, to look for further symptoms. If the abortion is not complete, the body of the uterus is probably soft and much thicker in the antero-posterior diameter than normal; and there will be still much compressibility of the supra-vaginal portions of the uterus (H. Sellheim, *Münch. med. Wochenschr.*, 1902, No. 10). In an abortion of the fourteenth or sixteenth week bimanual compression of the uterus produces occasionally a sense of grating or crackling that indicates a separation of the placenta. An easily dilatable cervix is always suggestive of incomplete abortion.

The diagnosis of abortion becomes most difficult when there are tumors of the uterus complicating the pregnancy, because the diagnosis of early pregnancy itself is peculiarly hard in such circumstances. The history of the case is the best guide under these conditions.

PROGNOSIS.

The prognosis in abortion depends much upon its causation. Women rarely die from spontaneous abortion, though it is occasionally followed by illness, as shown by chronic endometric changes and subinvolution, and, more rarely, tubal and peri-uterine inflammations. The only fatal form of disease associated with abortion is chorio-epithelioma, which is more frequent than has been supposed.

The prognosis must be more guarded, however, when abortion is the result of criminal interference. Olshausen (Stock, I. D., Berlin, 1897) attributes eighty per cent of all septic abortions to criminality. Various other authorities place the proportion of criminal abortions at from five to fifty per cent of the total number.

COMPLICATIONS.

The complications of abortion may be summed up as follows:

(1) Hemorrhage:
    (*a*) Profuse.
    (*b*) Continued.
(2) Sepsis.
(3) Retention of secundines, or incomplete abortion.
(4) Retrodisplacements.
(5) Uterine tumors.
(6) Extra-uterine pelvic disease.
(7) Diseases of other organs.

TREATMENT.

The treatment of abortion may be divided into four classes, namely:

(1) Preventive:
    (*a*) Before another pregnancy occurs.
    (*b*) Before symptoms of abortion appear.
    (*c*) Before threatened or imminent abortion occurs.
(2) During progress of abortion.
(3) After-treatment.
(4) Treatment of sequelæ.

(1) **Preventive Treatment.**—In the case of a woman who has repeatedly failed to carry the product of conception to term, the treatment must often begin before pregnancy occurs. The symptoms, both subjective and objective, must be carefully analyzed and any defect suggested by them remedied. If there is any history of syphilis, the prospective father should be

treated as well as the mother. Such treatment too often fails, because of the well known apathy and carelessness of the syphilitic, and therefore strenuous exertions must be made in regard to it. Some writers strongly advise the iodides in syphilitic cases; others prefer mercury alone. It is probably immaterial which course is pursued, provided whichever is adopted is kept up persistently. If syphilis can be excluded, the physician's duty as regards the husband is for the time at an end; it is true that he is often responsible for the occurrence of repeated abortions, even when he is not syphilitic, but there is no way at present of proving it.

In the treatment of the woman any disease of the uterus should be the object of attention. If there is a hyperplastic endometritis, a thorough curettage, followed by an application of equal parts of tincture of iodine and carbolic acid, should be tried. A laceration of the cervix must be repaired, and if there is much erosion of the cervical membrane or degeneration, either cicatricial or cystic, the cervix should be amputated. If the uterus is large and soft the following prescription is often of service:

℞ Ext. ergot. fl.	15.0,	1 part
Potass. bromid.	15.0,	"
Glycerin.	15.0,	"
Aq. dest.	90.0,	6 parts

M. S. Teaspoonful in water after meals.

This should be given for a month, unless contra-indicated by the appearance of a rash, or much mental depression, both of which results are rare. Large douches of hot water taken daily, with the patient in the dorsal posture, will assist in reducing the size of the uterus, and glycerin tampons inserted every second day are useful for the same end. The patient can introduce the tampons herself by means of a Thomas cupping glass, leaving it in place overnight.

Displacements of the uterus should be corrected by some one of the means at our command. Piles and fissures in ano must not be overlooked as possible sources of irritation. Whenever there is a general enteroptosis, a well-fitting abdominal support should be worn; not one which pushes the abdomen inward, but one that lifts it up. General hygienic measures must not be omitted, such as suitable clothing, proper exercise in the open air, cool to cold water sponge baths on rising, and wholesome, easily digested food. In fact the physician will always find that it is worth while to inquire into the patient's habits of life, for he may discover something which will greatly assist him in understanding the case.

When the patient is already pregnant, but no symptoms of abortion have as yet appeared, the history of former accidents should be carefully studied. If it proves on investigation that the earlier abortions have been in the habit of occurring at the time when a menstrual period might otherwise be expected, the patient must be kept quietly in bed and free from all care at such times. Dr. Ill keeps his patients in bed for three or four days and gives the dates at which the rest should begin; he also prohibits all sexual intercourse shortly before, during, and immediately after such times, and advises the avoidance of all alcoholic beverages, coffee, and tea. He has found potassium bromide in doses of ten grains, given in milk, three times daily after meals extremely useful. The bromide has a marked effect in reducing sexual excitement; larger doses are rarely required. The bowels should be moved daily by Rochelle salts in the shape of a Seidlitz powder, or, in plethoric women by a teaspoonful of salts of Carlsbad in a tumbler of warm water before breakfast.

Malpositions of the uterus should be corrected, but only the gentlest and most careful manipulations should be used, lest the very event which is to be prevented should occur. If there is a retroversion, or a retroflexion, or a combination of the two (which is the usual condition of things), the uterus should be replaced and kept in place by a pessary of small size. If it is not easily replaced by careful manipulations, it is best to desist and order the patient to lie in the knee-breast posture for from five to ten minutes daily, on a level cushion placed upon the floor, not on a bed. If the vulva are separated slightly at the same time, the air will rush into the vagina and enhance the postural effect.

Viburnum prunifolium may be given for weeks or even months at a time as a uterine sedative, and it has been highly spoken of for that purpose. It is best given in the form of the fluid extract, in twenty drop doses every four hours during the day. Iodide of potash with iron has been suggested for the treatment of habitual abortions, no matter what may be their cause (Lomer, *Zeitschr. f. Geb. u. Gyn.*, 1901, vol. 46, p. 306). In nervous and excitable women tincture of valerian or valerianate of zinc, is serviceable.

When abortion is threatened or imminent, the history of former abortions must again be carefully studied, as regards character, relation of occurrence to regular menstrual periods, and age of former interrupted conceptions. If the former abortions have been preceded by a slight flow, at or near a time when menstruation would be expected, the patient must be put to bed immediately on the appearance of the first symptoms of a flow of blood or of pain. The case need not be regarded as hopeless, for even large hemorrhages may not be followed by abortion, and the patient may be encouraged accordingly. She must be kept absolutely quiet with small doses of opium (0.02 grams, or one-third of a grain, every two or three hours), preferably often repeated, not so much for the effect of the drug on the uterus as for the general quieting influence upon the system. Cannabis indica in the form of the tincture, given in ten drop doses every two hours, is sometimes most satisfactory. Viburnum prunifolium and asafoetida are highly recommended, and both of them can be given indefinitely, which is not the case with the other drugs mentioned. The bowels should be kept open by means of a mild laxative, preferably a saline. All excitement, both mental and physical, should be carefully avoided, sexual intercourse prohibited, and a very light diet advised. The importance of absolute mental quietude cannot be overestimated nor too much impressed upon the patient's friends. It is a good plan to keep the patient on her back with the foot of the bed elevated from ten to twelve inches, and only a small pillow under her head; this posture reduces the influx of blood into the pelvic organs and has a marked tendency to empty the veins. In many instances it will tide the patient over a critical period.

Vaginal examinations, whether instrumental or digital, should be restricted; the use of light tamponade of the vagina, advised by some authorities, is of no service, and often proves fatal to the ovum. A light hot-water bag over the pubes sometimes relieves the uterine contractions. The patient must be kept in bed for several days after the flow and the pains have ceased, and only gradual, careful exercise should be permitted when she first gets about again. The importance of easy evacuations of the bowels must be insisted upon.

When the flow continues for a long time, weakening the patient to a marked degree, it may be necessary to hasten the abortion, but so long as there is any likelihood of a living fetus, the advice and concurrence of a second practitioner should be asked before taking active measures.

Treatment during Progress of Abortion.—If, in spite of all endeavors, abortion takes place, the treatment may be either expectant or active. These two forms of therapy should not be regarded as diametrically opposite, but rather supplemental, one to another. The expectant plan of treatment is right and justifiable up to a certain point, just as it is in labor at term; but when the natural forces fail, or dangerous hemorrhage appears, active treatment must be vigorously enforced.

Expectant treatment may be furthered by such drugs as ergot and gossypium, which must not, however, be given in large doses for fear of causing tetanic contractions. This is especially true of ergot, which has, at times, a tendency to contract the cervix.

The dangers of expectant treatment lie in the fact that the patient may suffer great detriment to health by reason of prolonged confinement and improper involution of the uterus, and also it may afford opportunity for septic infection. Hellender has reported an important and interesting investigation into seventy-four prolonged abortions in which not one uterus remained sterile; all contained bacteria though only twenty of the patients had any fever (*Deutsch. Gesellsch. f. Gyn.*, 1903). Bacteria find their way into the uterus along with coagula of blood or membranous material which hang from the cervix. Sepsis is also to be feared when many instrumental or digital examinations are made, indeed, it is true in abortion, as in labor, that the more numerous the examinations the greater the danger of sepsis. The bad habit which some women have of making digital examinations themselves, is undoubtedly a source of sepsis. Expectant treatment may even prove fatal in the case of abortion which is the result of criminal interference.

In abortion we have to do with a pathological process where nature does the work of repair with greater tenderness and completeness than we can, and therefore there should be here, as in all surgical work, distinct indications for active treatment. So long as the patient's health does not suffer, the expectant plan of treatment may safely be continued. An important indication for active interference is excessive hemorrhage, which is most common in the twelfth to the sixteenth weeks, when the vascularization of the parts is great. Hemorrhages also occur, now and then, in the earlier months, but life is rarely endangered by them at this stage. If the hemorrhage is slight and the ovum has not ruptured, it is well not to be too hasty in active treatment. Excessive hemorrhage can often be prevented by bringing about uterine contractions and securing separation of the decidua, and the longer pregnancy has continued the more important is this measure—the hemorrhage at the fourth month is often appalling. A most satisfactory way of carrying out this measure is the introduction of a firm vaginal tampon of iodoform gauze, which is left *in situ* for from twenty-four to forty-eight hours. In cases where the cervix closes upon the secundines after expelling the fetus, a vaginal tampon will often cause a reopening of the canal. Iodoform gauze is most satisfactory because it is less apt to take on a foul odor in course of time than plain sterile gauze. The gauze should be a strip five yards long and three inches wide and the tampon should be applied with the patient in the Sims, or better still, in the dorsal posture, when most attention can be paid to cleanliness. A Sims speculum should be used to retract the perineum and the gauze is pushed up along the hollow of the blade with a dressing forceps, taking small lengths and pushing them well into place, much after the manner of a dentist when filling a tooth. Thus Douglas' cul-de-sac is first filled, then the right fornix, then the left, then the vault anterior to the cervix, and lastly the vagina.

It is hardly necessary to say that a vaginal tampon has lost its usefulness when the product of conception has been forced into the cervical canal. Its removal is best accomplished by means of a small right-angled tenaculum, slipped along the posterior wall of the vagina. The gauze is caught and withdrawn with but slight inconvenience to the patient. It often happens that the whole product of conception is found in the vagina when the tampon is removed. Astringent tampons should never be used, because of their irritating effect upon the vaginal mucous membrane and the danger of furnishing a nidus for septic infection. Styptics, whether vaginal or intra-uterine, are, in my own opinion, of no use at all.

Intra-uterine Tampons.—Uterine tampons are occasionally serviceable in the control of hemorrhages, by their power of inducing uterine contractions. They also assist in the separation and possibly in the expulsion of the uterine contents, besides checking hemorrhage, dilating the cervical canal, and preparing the uterus for further manipulation, if necessary. A uterine tampon should never be used, however, when a vaginal one will suffice, for the danger of sepsis as well as of injury to the uterine wall is much greater; moreover, there is no certainty that the hemorrhage is permanently relieved, for the bleeding decidua may remain *in utero.*

The indications for the use of uterine tampons are:

(1) Failure of uterine contractions.

(2) Failure of vaginal tampons to give desired result.

(3) Expulsion of the fetus during the latter weeks in which abortion may occur (twelfth to sixteenth) followed by contraction of the cervix.

(4) Intimate adhesion between the decidua and the secundines and the uterine wall, causing violent hemorrhage on the attempt to remove the secundines.

(5) Persistent hemorrhage after removal of secundines.

In the last case the intra-uterine tampon will assist in the removal of particles of decidua where the finger or curette have failed, on account of softness or sponginess of the uterus.

Method of Introducing Uterine Tampons.—The best material for a uterine tampon is ten per cent sterile iodoform gauze, in strips two inches wide and five yards long. These should be kept in readiness in screw-capped bottles, covered with a piece of sterile cotton or plain sterile gauze; the outside gauze can be used to wipe the vagina dry. The patient must be prepared as for a major operation, on account of the risk of septic infection. The vulva should be shaved, and scrubbed with soap and water; the vagina flushed with a solution of bichloride of mercury (1:5000). The patient is then placed on a table, in the dorsal posture, with a Kelly pad, real or extemporized, under the buttocks and her feet held up by stirrups. Sterilized towels should be laid over all adjacent parts, the vulva alone being exposed. When sterilized towels are not in readiness, they may be prepared by placing the towels in a basin with a definite amount of bichloride of mercury, after which boiling water is poured over them in amount sufficient to make the solution 1:1000. The cervix is exposed to view by means of a single-bladed Sims speculum (see Fig. 108), inserted in the vagina, and then drawn towards the neck of the bladder by an American bullet forceps, so as to straighten the cervical canal. While these preparations are being made, the parts are sprayed with a solution of bichloride (1:5000), and when all is in readiness this is shut off. The vagina is first wiped dry with the piece of iodoform gauze already mentioned, and then one of the strips of prepared gauze is introduced into the uterus and carried well up to the fundus by means of a Bozeman's dressing forceps or a Kelly's gauze packer. It must be carried up into both horns and the whole cavity gradually filled. The vagina is filled with the remainder of the loose gauze or with a second five-yard strip, which must be packed firmly around the cervix. Iodoform gauze is preferable, in spite of the great opposition to its odor and the danger of iodoform poisoning, because it becomes less foul in the course of twenty-four to forty-eight hours than plain sterile gauze. This is on account of the decomposition of iodoform, by which iodine is liberated, this being one of our best and least harmful antiseptics. In cases of emergency a roller bandage of gauze, two inches wide, can be boiled for five minutes in a bichloride solution (1 : 1000), or a boric acid solution (1 : 100), and thoroughly wrung out. The greatest care should be used not to let the gauze touch any part of the body except the vagina while it is being introduced. Iodoform gauze can be allowed to remain in place for two days but one day is sufficient in most cases. The bichloride gauze must not remain longer than twenty-four hours and it should preferably be removed earlier.

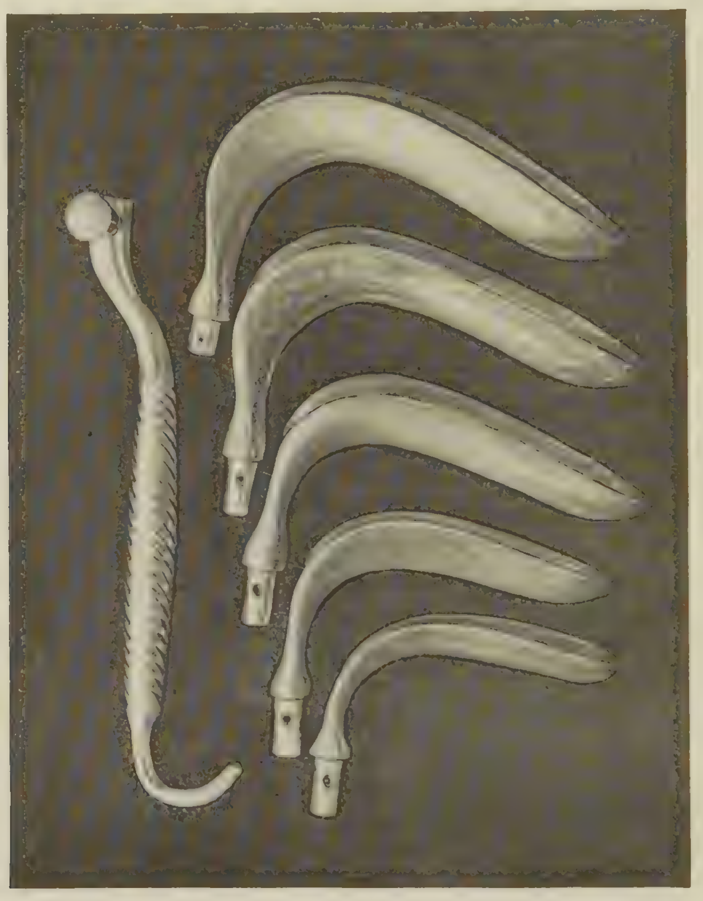

Fig. 109.—Specula of Various Sizes Adaptable to One Handle Necessary to Expose the Vault of the Vagina and the Cervix in the Treatment of an Incomplete Abortion.

An intra-uterine tampon should never be used except through a speculum and under the most stringent antiseptic precautions. Special difficulty will be encountered when the uterus is unusually soft or retroflexed. The introduction of the tampon must be preceded by anteversion of the uterus, when it can be accomplished, and the gauze packing must be controlled by a hand on the abdomen, for much harm may be done by anything but the most delicate manipulations.

Massage of the Uterus.—Bimanual massage and expression accomplishes for the aborting, non-contracting uterus what Credé's "*Hand-griff*" does for the expression of the placenta from the puerperal uterus at term. Hemorrhage can quite often be controlled without intra-uterine interference, but expression of the secundines is not often accomplished without it. The method is especially serviceable when the patient is bleeding profusely and nothing is ready for intra-uterine treatment.

Method of Massage.—Two fingers of the right hand are placed anterior to the cervix against the corpus uteri with the palmar surface forward, while the left hand seeks the posterior wall of the uterus. The left hand presses against the finger in the vagina by a rotary movement; it is important that the fingers in the vagina should be kept absolutely quiet, and especially that no rubbing or boring motion should be made with them. All motions must be made by the external hand, the internal hand being used as a fixed point or fulcrum. If the whole of the fingers on the external hand are used and the compressing force increased gradually and with gentleness, the patient experiences little pain and makes little resistance; if, on the other hand, only the tips of the fingers are used, the pain is unbearable.

When the hemorrhage has been controlled by this means, the uterus is well contracted, and the secundines not expelled, the physician can proceed to attend to the further treatment of the case according to the indications, at his leisure.

Mechanical Evacuation of the Contents of the Uterus.—The removal of the uterine contents is without comparison the best treatment for hemorrhage accompanying abortion, but it must be remembered that repeated attempts to clean the uterus are fraught with great danger to the patient because of the likelihood of septic infection. Mechanical evacuation should be done thoroughly and with all the aseptic precautions that a conscientious practitioner has at his command. It makes little difference whether it is done manually or instrumentally so long as it is done thoroughly and with cleanliness. In the last month in which abortion can occur (twelfth to sixteenth weeks) with a dilated cervical canal and a soft uterus, the finger answers the purpose, provided the fundus can be reached by it and the uterus is freely movable. If, however, the fundus uteri cannot be reached without the introduction of half the hand into the vagina, the procedure is of doubtful value. The finger in the uterus should be controlled by the hand on the abdomen, by which the uterus is pushed down to it; in this way really good contractions can be secured. Extensively adherent particles of the decidua and chorion are difficult to reach, especially when they are situated in the horn, and such cases may require instrumental interference. Further advantages of the finger are the positive knowledge afforded by it that nothing remains *in utero*; the fact that hemorrhage is not excessive after its use, as the finger acts as a tampon to the cavity; and, finally, the limited number of instruments required. In the early months, however, the finger is useless unless the product of conception has come down into the cervical canal. Unfortunately the gloved finger is of no use, because of the lack of tactile sensation, while the danger from the septic finger-nail in the ungloved finger cannot be overestimated.

Extensive injuries are hardly possible when the finger alone is employed to empty the uterus; they generally arise from instrumental interference, whether by the curette or the forceps. Twenty inches or more of intestine have been drawn out through the uterus with forceps, and in other cases the omentum has been drawn into the uterus with the curette. Emulsions and bichloride of mercury solutions have been poured into the peritoneal cavity. This is a good place to emphasize incidentally the importance of sending immediately for an abdominal surgeon when an accidental perforation has occurred. The physician in charge of the case should instantly stop all attempts at further intra-uterine work and place an iodoform gauze tampon in the vagina, while waiting for the surgeon. Instrumental interference under these circumstances is not only admissible, but absolutely indispensable.

The extremes of opinion as to the use of the curette in mechanical evacuation of the uterus are differently represented by two observations. Kneise (*Münch. med. Wochenschr.*, 1903, No. 43) calls attention to the fact that in the University Clinic at Halle, only one per cent of abortions required such assistance. He reports five hundred cases. On the other hand, Dumitriu (Frommel's *Jahresbericht*, 1905) reported that out of one hundred abortions he has used the curette ninety-one times.

The danger in using the curette is not so much from the risk of perforation (provided it is in careful and gentle hands), as it is in failure to do the work thoroughly, or, in other words, to remove the secundines. This danger can be avoided by:

(1) A thorough understanding of the position and size of the uterus.

(2) A thorough understanding of the consistence of the uterus. The importance of this condition cannot be overestimated. The septic uterus is extremely soft and the danger of perforating it necessitates the utmost gentleness in the use of the curette. Only one of a large size should ever be used.

(3) The administration of an anesthetic.

(4) A most thorough asepsis.

(5) Such posture of the patient that the operator's hands are entirely free and at liberty to work with the greatest gentleness compatible with rapidity and thoroughness.

(6) A well-dilated or dilatable cervix.

(7) Refraining from the use of the curette when, at the end of the fourth month, the whole placenta is in the uterus, and reliance instead upon the dilating tampon, the finger, and the polyp forceps.

Method of Mechanical Evacuation.—In the majority of cases it is necessary to give an anesthetic, but in cases where this is troublesome or impossible, the difficulty may be overcome by the administration of one-tenth of a grain of morphin hypodermically just before the mechanical evacuation. The patient must be thoroughly cleansed and prepared as described under the head of uterine tampons, after which she must be placed upon a table, not a bed, with a Kelly pad under the buttocks. The field of operation is thoroughly scrubbed after the patient is under the anesthetic, and the surrounding parts protected by sterile or bichloride towels. The following instruments are essential: A single-plate Sims speculum (Fig. 108, p. 442) to retract the perineum; a bullet forceps; Ellinger's and Goodell's dilators or else steel sounds to number thirty-six (French). I have sometimes used Kelly's urethral dilators, sometimes with good results. A well-rounded sharp curette (a dull curette is rarely indicated); a placental forceps; Fritch-Bozeman's double canula irrigator, a Bozeman's uterine dressing forceps or a Kelly's gauze packer, and a douche bag.

Sponge or laminaria tents are rarely used to-day; if they are employed they should be enclosed in a thin rubber tube which is filled with water after its introduction into the uterus; the upper end of the tube should be closed with a string before insertion, while the lower end is closed after the water is injected. By this method of procedure most perfect asepsis is secured. After the cervix has been exposed by the speculum, and drawn towards the pubes with the bullet forceps, the canal is dilated, if necessary. When the abortion is one of less than ten weeks, the curette can be introduced immediately after the dilatation and the uterus cleaned by gentle motion from above downwards. The physician should accustom himself to curetting the cavity in regular order, thus: the posterior wall, the anterior wall, the left side, the right side, and the horns should be scraped in the order given. After the twelfth week the curette is apt to slide down the membranes, and it will be necessary to use a large placental forceps with dull edges to start the placenta, after which the curette can be used to finish the work. Under all circumstances the curetting must be done with thoroughness, after which the cavity is irrigated with a sterile normal salt solution, or a solution of bichloride, 1 : 5000, great care being taken that there is a free flow from the canula or the uterus. The moment the flow stops, the instrument should be withdrawn.

In an abortion during the early months a strip of gauze should be placed in the uterus, reaching up to the fundus, and removed in twenty-four hours. If the case is late in the fourth month the cavity should be well, but not rudely packed, and a second strip used to fill the vagina. This procedure not only stops hemorrhage but sets up firm contractions, drains the uterus, and assists in a prompt involution of the organ. The gauze is removed in twenty-four hours. A large dose of ergot or gossypium will assist materially in assuring a firm contraction. Three large doses of one teaspoonful each may be given on the day after operation, four hours apart. Quinine has been reported as giving excellent results as a uterine contractor; it should be given in solution every ten minutes, but not more than two or three doses in one day (Walther, *Zeitsch. f. Arzt. Fort.*, 1903, No. 20–21).

Special precautions must be employed in the case of the retroflexed, fixed, soft, friable uterus and in one which is acutely inflamed. The latter will be spoken of under the head of septic abortions.

After-treatment.—It is wise to keep the patient in bed for from six to ten days. All douches and local interference of any kind should be avoided, unless some special indication arises, as unnecessary and therefore useless. The patient must be kept clean and a vulvar pad should be worn. For urination and defecation a commode may be used, if she is able to sit up at all; the urine should not be drawn if it can possibly be voided, for fear of a septic cystitis. Before the patient gets up, it is wise for the physician to assure himself of the proper involution of the uterus, taking into account the time since the abortion took place. If the uterus is not in proper condition suitable treatment should be instituted.

SEPTIC ABORTION.

One of the most serious complications arising from abortions is the septic or sapremic condition.

By septic abortion is meant an infection of the uterine cavity and its contents with pathogenic germs, with the production of fever and possibly chills. It is one of the most frequent conditions met with and is commonly the result of criminal intent. Olshausen attributes eighty per cent of all septic abortions to criminal interference. I might mention the fact that when I was a student I was much impressed by something said to me by my preceptor, namely, that he had never seen a woman die from a septic abortion due to natural causes, but that he had seen many die from criminal interference. This was in the days when physicians rarely interfered in the normal mechanism of abortion, except to remove from the cervix what had been forced into it by the uterus. Septic abortion is less frequent in women of middle life than in the young, a fact easily explicable by the more delicate fabric of the tissues in youth. The same thing is true of septic peritonitis, due to the fact that there are fewer lymphatics in the old than in the young.

The sapremic condition is not very frequent. It should be treated by the establishment of thorough drainage and prompt removal of the decomposing uterine contents as already described (see mechanical and manual evacuation of uterus). It is hardly necessary to say that perfect asepsis is essential to success.

The treatment of septic abortion in the early stages is the same as that just mentioned. It will be wise to place the patient on a liquid diet as long as there is much fever. An ice bag above the pubes is good as long as the temperature is above 101° F.; a towel should always be placed between the ice bag and the skin. While the cold is pleasant to the patient as long as there is fever, the reverse obtains when the temperature is below the point just given. To carry out this treatment properly the temperature should be taken every three hours; a rectal temperature is the only safe one to take. If the bowels are constipated a saline cathartic will relieve the patient. The greatest care will have to be exercised in all manipulations when the process has advanced, on account of the softening of the uterus or its surrounding tissue. Lymphangitis and phlebitis are common complications; tubal and ovarian abscesses also occur, but less frequently, unless the case is of a gonorrheal character. When these complications occur the treatment already described is not sufficient and therapeutic measures suited to the special indications must be adopted.

When the abortion occurs during the earlier months and there is little periuterine complications, an injection of a ten per cent mixture of iodoform in glycerin should be made into the uterine cavity through a small soft-rubber catheter and a glass syringe, and the vagina filled with iodoform gauze. The catheter should be small, and an easy outflow of the mixture should be assured; a solid tube must never be used for the purpose. The injection should be made slowly and without any force.

If the case has arrived at or near the fourth month and the septic process is kept up by particles of dead matter, or, in other words, the pathogenic organisms are fed by them, I would recommend an intermittent alcohol intra-uterine injection as by far the best mode of treatment. It is absolutely harmless and easy of application even by the most inexperienced, after the drain has once been into the uterus, and it disturbs the patient to but a slight extent, as after the first application she is not again removed to a table. Besides the instruments enumerated (see p. 445) the operator must have a soft round catheter (No. 20, French) to which is fastened by a glass joint another tube about sixteen inches long, armed with a small glass funnel or the barrel of a glass syringe. Two pieces of string about sixteen inches long are boiled with the rest of the instruments. The patient is prepared as already described, and the operator proceeds as in evacuation of the uterus until he arrives at the introduction of the gauze. He then takes a careful measurement of the depth of the uterus and ties a string with a clove hitch to the portion of the catheter which will be exposed just outside the cervix when the instrument is inserted into the uterus as high as the fundus. The catheter is introduced into the uterus up to the fundus and a small strip of gauze packed up into the uterus as far as each horn. The string spoken of is then tied to the gauze strip and the vagina packed with the remainder of the gauze. The purpose of the string, which ties the gauze to the catheter, is to prevent the catheter being pulled out by accident, for if this were to occur, it would be necessary to remove the gauze in the vagina. The rubber tube with the funnel is fastened to the catheter and a twenty-five per cent solution of alcohol poured into the catheter through the funnel, until it begins to flow from the vagina. This douche must be repeated every two hours. In private practice among the less fortunately situated, where no trained nurse is at hand, the physician should make the following arrangements. He must prescribe a quart bottle of the solution of alcohol:

℞ Spirit. vini ....one part = 250.0
Aquæ ....three parts = 750.0
M.

He should give the attendant an empty, clean, two-ounce bottle and direct her to fill it with the dilute alcohol and pour it into the funnel every two hours. The funnel and tube are placed on a clean towel on the patient's abdomen and held there by a binder. The apparatus does not annoy the patient and she does not have to remain flat on her back. The only pain produced by the treatment is that caused by the first flow of alcohol over the perineum. The catheter should remain in the uterus for five days, unless the temperature falls below 101° F., taken in the rectum, but, as it drops, the injections are given less frequently. When the temperature has remained below 101° F. for twenty-four hours, the dressing may be removed. If there is no improvement in the septic condition during the first twenty-four hours there is probably some abnormal condition outside the uterus.

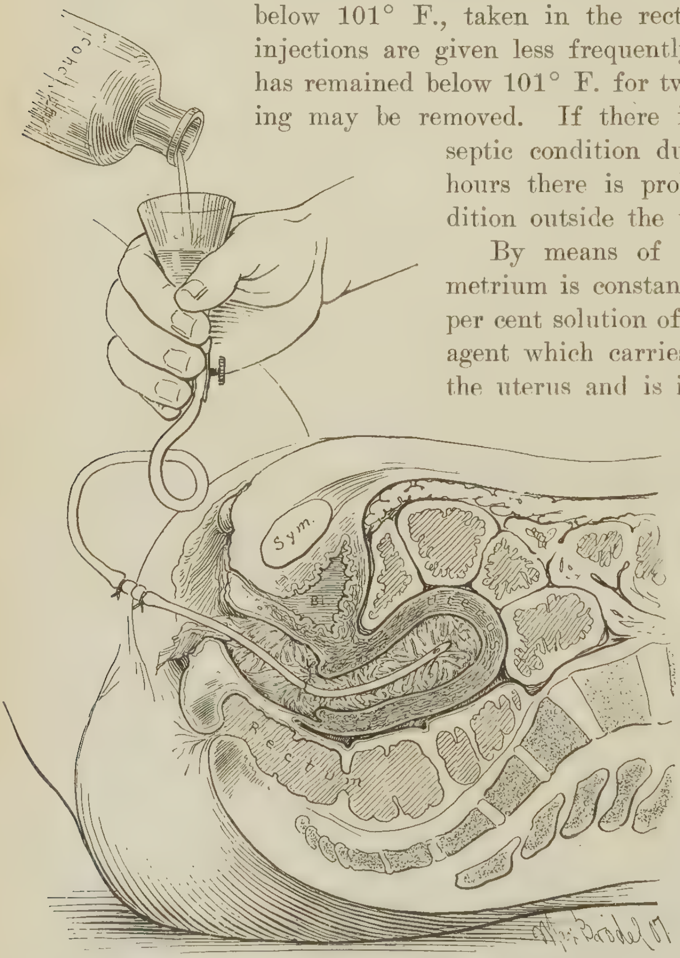

FIG. 110.—METHOD OF IRRIGATING THE INFECTED UTERINE CAVITY. The catheter is placed within the uterus, together with the drainage pack. By attaching a funnel, as shown, alcohol (25 per cent) can be introduced into the uterus as a disinfectant.

By means of these injections the endometrium is constantly bathed in a twenty-five per cent solution of alcohol. The gauze is the agent which carries it through the cavity of the uterus and is itself constantly kept clean by the fluid. A second string is fastened to the catheter and cut short at the vulva—it is simply a mark to show that the catheter is not displaced. I have always used this method for over ten years and have never seen any evil results from it; on the contrary, it has done much good. The earlier it is used in the disease the more satisfactory are the results. When there is already extensive disease, palpable or otherwise, outside of the uterus, the result is less satisfactory. Figure 109 shows the method in action. The thumb-screw near the funnel is placed there to keep the tube full of the dilute alcohol and facilitate its flow by gravity when the funnel is filled and the thumb-screw opened. If this treatment is pursued in the later months of pregnancy a small-sized stomach-tube answers the purpose.

Extensive peri-uterine disease, when it exists, must be met by such treatment as has been described. Extirpation of the uterus has not met with much encouragement. If the sepsis is still confined to the womb, it is hardly justifiable, while if the infection has gone beyond the uterus, it is useless.

Hemorrhage and sepsis are not the only indications for evacuation of the uterus, although they are all that have been discussed. A woman cannot be allowed to go on indefinitely with retained secundines, simply because they produce no dangerous symptom. The constant loss of blood, the inability for exertion, the annoyance induced by the uncertainty of the future, and the convenience of her physician, are all factors to be considered, always provided that the death of the fetus is *certain.*

CRIMINAL ABORTION.

In criminal abortion, mechanical, electrical, and medicinal agents are all employed. So far as the moral aspects of the question are concerned they are equally bad; so far as the injurious effects upon the woman are concerned, the medicinal are the least harmful and least successful, while the mechanical method of thrusting a sound into the uterus affords the greatest risk of sepsis. The criminal abortionist often combines the electric method with the mechanical one, in which case he is apt to get the ill effects of the latter. To what extent the medical profession is responsible for the murder of the unborn is shown by the fact that women often use gum catheters themselves and are sufficiently well posted to boil them before their insertion. The punishment of such criminals is always difficult, as popular sympathy is rather with the abortionist and murderer, and the witness is apt to be an unwilling one.

ARTIFICIAL ABORTION.

When the continuance of pregnancy threatens life, the claims of the mother have a prior right to consideration and it is the duty of the medical attendant not only to suggest, but to urge its termination. The following conditions justify the induction of abortion:

(1) Pernicious vomiting.

(2) Acute Bright's disease.

(3) Certain grave constitutional diseases, which must end fatally in the near future.

(4) Eclampsia.

(5) Severe pyelitis.

Pernicious vomiting is one of the most important indications for the induction of artificial abortion, and when its existence can be clearly shown, the pregnancy should be promptly brought to an end. Not all forms of troublesome and persistent vomiting, however, are pernicious, and it is most important to distinguish between the real pernicious variety and that which is only an exaggeration of the nausea which is one of the commonest accompaniments of pregnancy. When the patient vomits persistently at intervals all day and all night, the vomiting being associated with the ejection of bile; when the condition becomes so aggravated that no food whatever is retained, and the patient's strength is so exhausted that she is confined to bed for the greater part of the time; and when this condition of things has lasted for from ten days to a fortnight, it is almost certainly pernicious.

In all cases of severe nausea it is extremely important to determine the relationship of the ammonia output during pregnancy to the total amount of nitrogen in the urine. The proteids of the food are the source of the nitrogen, and nitrogenous waste products represent proteid waste. The average waste in the ordinary individual is fifteen grains in twenty-four hours. It is most important to remember that the clinical manifestations are not necessarily in proportion to the increase of ammonia output. In neurotic women, vomiting may be excessive with little or no increase in the proportion of ammonia, whereas in other cases where vomiting is comparatively slight, the ammonia output is dangerously large. The necessity for inducing abortion must be decided solely by the increase of ammonia, and whenever this rises above ten per cent the uterus must be relieved of its contents without delay. To ascertain the point positively, a careful chemical analysis must be made, determining the relation between the ammonia and the total amount of nitrogen in the urine. If the physician is at a distance from a chemical laboratory, he should take six ounces of the urine, add to it a teaspoonful of chloroform, and send it to the nearest well-equipped laboratory.

Acute Bright's disease undoubtedly affords an urgent reason for emptying the uterus, and whenever there is the slightest suspicion of the presence of a nephritis its existence or non-existence must be determined without a moment's unnecessary delay.

In grave constitutional disorders which may end fatally it is the prerogative of the mother to decide whether or not she will go through with the pregnancy. Such diseases are: Aneurism, cerebral disease, cardiac disease, a rapidly advancing phthisis, etc.

Eclampsia.—This condition occurring at any time during pregnancy constitutes an urgent reason for inducing abortion.

Pyelitis.—A mild case of pyelitis is often relieved by rest in bed, urotropin, and drinking large quantities of water. In some cases excellent results have been obtained by catheterization of the kidney and irrigation of the pelvis. In more severe cases, however, with a large amount of pus, fever, and perhaps pain in the kidney, the only possible treatment is the induction of abortion, which in many cases gives prompt relief.

In addition to the cases which come under one of these five fundamental indications, the advice of the medical man may occasionally be sought under circumstances of a special character. For example, he may be urged to induce an abortion in the case of an illegitimate pregnancy, and here it is his duty to give an unqualified refusal, no matter how pitiful the circumstances may be, nor how strong the reasons for "saving a young girl's reputation." Again, he may be importuned by a wife worn out by frequent child-bearing and dreading the exhaustion consequent upon another pregnancy and labor, with the added fatigue of lactation and of caring for another infant. No matter what reasons may be brought to bear, the upright physician must maintain the principle that in entering upon the married state, husband and wife covenant to bear the burdens it naturally imposes, and to make such sacrifices as are demanded by proper standards of right, clean living, even at the expense of loss of health, as well as of plans and social opportunities upon which their hearts may be set. The position of a husband and wife who have a young family to support and look forward with anxiety to an additional burden when strength and means are already taxed to their utmost, is a sad one, and the duty of the family physician is not confined to a refusal to consider the question of an abortion. He should step in as a friend as well as a medical adviser, using all his influence to dissuade the parties concerned from a measure so fraught with peril to the moral nature, as well as to health and even life, trying further to persuade them to take a wider view of such an act in its relation to the character of the individual and to the community at large.

Method of Artificial Abortion.—When the preservation of either the health or life of a woman is at stake, it is not only justifiable, but absolutely obligatory, to interrupt a pregnancy. This should be carried out with the greatest care in order to escape the dire results of hemorrhage and infection so common after improper and careless work. The two chief things are to comply with perfect asepsis and to effect a complete dilatation of the cervix. Unless the operation meets these two cardinal prerequisites it should not be done. Perfect asepsis guards against infection and a complete dilatation of the cervix makes possible a control of hemorrhage which otherwise may be very severe. To be compelled to rapidly dilate a cervix to relieve a dangerous hemorrhage due to abortion is a very unpleasant task. Such is the condition frequently met with where abortions have been caused by introducing a sound into the uterus. The friability of the cervix and the resulting tears are astonishingly common. Happily, the vaginal Cæsarean section introduced by Dührssen gives us an alternative in these cases. I advise it in all cases where a rapid dilatation is necessary, as, for example, in a placenta prævia.

An effectual and simple method of causing abortion is as follows: The patient's vulva and surrounding parts are carefully shaved, cleansed with soap and water, and sterilized with alcohol and 1–1,000 bichloride solution. The patient is then put in the Sims left lateral posture, the perineum is retracted with a speculum, and the cervix grasped with tenaculum forceps. The vagina is then cleansed with a tincture of green soap and water, ninety-five-per-cent alcohol, ether, and 1–1,000 bichloride solution, after which it is carefully dried out. A large male rubber catheter, which has been sterilized by boiling, is then introduced well up into the uterus; the vagina about the catheter is loosely packed with sterile gauze. All of this can be carried out without any anesthesia, in the patient's bed or in the operating room. The patient is then kept in bed, and, as a rule, within twenty-four hours the cervix will be completely dilated and the abortion over. Prior to the third month the abortion is frequently incomplete, later it is nearly always complete. Indeed, after the third month a complete abortion usually results from merely dilating the cervix, rupturing the membranes, and allowing the escape of the contained amniotic fluid. When, after a complete dilatation of the cervix, there is evidence that the ovum or parts of it have not come away, as indicated by bleeding or continued pain, the patient should be anesthetized, put in the perineal posture on an operating table, and the ovum separated from the uterus by the finger introduced through the cervix. The hand during this procedure should always be covered with a thin rubber glove. The finger can often be supplemented by the use of the placental forceps and the dull curette. Instruments should be employed, however, with the greatest care, and, as a rule, the finger is all that is necessary. At the conclusion of the removal the entire uterine cavity should be carefully gone over by the finger. If this precaution is not taken, pieces of placenta or membranes will frequently be left in, however careful the operator may be. In one case a competent obstetrician of my acquaintance, after doing what he considered a complete abortion, was distressed to have his patient showing signs of further trouble. At a second operation he discovered that he had left twin fœti in the uterus, having neglected to palpate with the finger.

At the conclusion of the removal of the ovum the uterus can with advantage be washed out with hot sterile, normal salt solution. If there is still hemorrhage, which is infrequent, the uterus should be packed with an iodoform gauze pack, to be removed in twenty-four hours. After removal, full doses of ergotol are of advantage in bringing about a contraction of the uterus and a cessation of the hemorrhage.

CHAPTER XIX.

INJURIES AND AILMENTS FOLLOWING LABOR.

Importance of prophylaxis, p. 453. Sequelæ of labor: Physiological, p. 453; abnormal and pathological, p. 454. Prevention of sequelæ: Use of forceps, p. 458; protection of perineum, p. 459; repair of perineum, p. 460; repair of cervix, p. 462; precautions against infection, p. 462; use of catheter, p. 462; choice of nurse, p. 463.

INASMUCH as a large number of gynecological affections date from childbirth, there is manifestly a wide field for the exercise of prophylaxis in obstetrics. The prevention of a large amount of serious gynecological work lies in the hands of the general practitioners who are caring for women in childbirth to-day. May I add that it is a far higher function of the profession to prevent a thousand cases of rupture of the perineum than to cure the same number by appropriate surgical operations, however brilliant or however praiseworthy the latter may be.

SEQUELÆ OF LABOR.

Labor is a physiological process; therefore, if the mother is in good health, if her pelvis is normal, and her tissues in good condition, she should rise up from her bed a perfectly sound woman, provided, of course, that the child presents no abnormality, and that the labor has been well conducted. Even in a perfectly normal labor, however, certain slight injuries and changes are liable to occur of so slight a character that they may be regarded as physiological.

The **physiological sequelæ** observable after a normal labor are:

A large uterus beginning to contract, with a raw inner surface, pouring out the lochia.

A fresh lacerated wound of the cervix.

A lax, distended vagina.

A lax, distended, and everted vaginal orifice, with fissures extending to the hymen.

A laceration of the perineum, superficial in extent, with one or two superficial branches running into the vaginal sulci.

Dilatation and eversion of the rectum with dilatation of its veins, most frequently seen in multiparæ.

A slight bilateral laceration of the cervix.

A slight hypertrophy of the uterus.

A widening of the vagina, with tears in the region of the hymen, and a slight laceration of the vaginal introitus.

The **abnormal** and **pathological sequelæ** of labor are:

Mechanical injuries, such as tears or ruptures, relaxations, sloughs, retroflexion, descensus, and prolapse.

Infections of both the upper and lower genital tracts, including the uterine tubes, the uterus, the cervix, the pelvic cellular tissue, the vagina, and the perineum, as well as the bladder. Venous thrombosis in the broad ligaments.

Nerve exhaustion.

Toxemias resulting in Bright's disease and its sequelæ.

These pathological sequelæ result in a variety of gynecological conditions, which make themselves first known months, or, it may be, years later.

The mechanical injuries cause deep lacerations of the cervix, extending down onto the lateral walls, in the form of falciform scars, which serve to fix the uterus to the pelvic wall. Rarely the cervix survives the injury with a fistula in one side (see Fig. 111). As a rule a defect such as that seen in the illustration is due to an attempted closure of a central tear, which has not resulted successfully. Radiating scars are found at the pelvic outlet, beginning in the perineum and extending upwards in a "V" shape into the right and left sulci. In rare instances, the perineum is simply in-

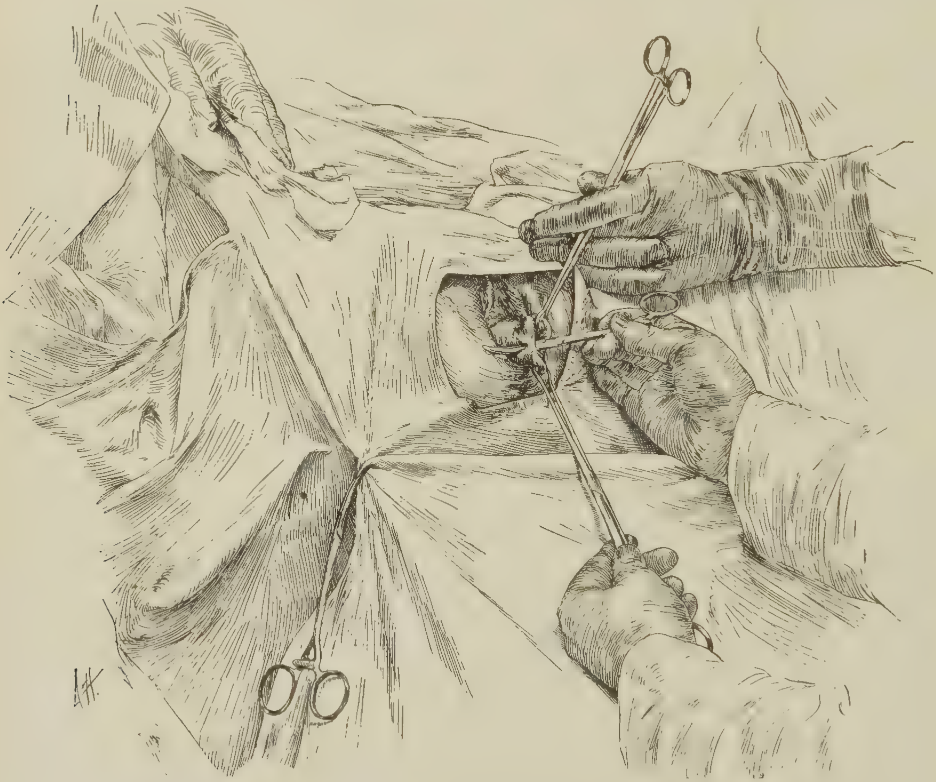

FIG. 111.—ONE OF THE RARER INJURIES FOLLOWING LABOR IS A CERVICO-VAGINAL FISTULA. This is most frequently found after an unsuccessful attempt to denude and unite the torn cervical lips.

filtrated, and still more rarely, the child is born per anum. The extreme form of injury at the pelvic outlet is a complete tear (see Fig. 112) dividing the septum between the rectum and the vagina and throwing both outlets into one common cloaca. Among the tears which eventually become serious in their consequences, but are often not perceptible at the time they are made, is the injury received from the separation of the attachments of the levator ani muscle from the rectum. This injury, associated as it is with the tear of the perineum, results in an entire loss of support to the lower part of the bowel, with the formation of a rectocele, or the eversion of the lower vaginal wall. The outlet thus presents an appearance described as relaxed (see Fig. 113). The relaxed outlet is recognized by the vertical direction of the levator fibres, just behind the pubic arch, replacing the strong band felt when the posterior vaginal wall is lifted up in the unbroken ring. It is a good plan, in order to be precise as to the degree of the breaking down of the outlet, to use an instrument like that shown in the figure (see Fig. 114). By separating its blades to a maximum without using more than slight force, the degree of relaxation is read directly in centimetres from the scales attached to the handles of the calibrator.

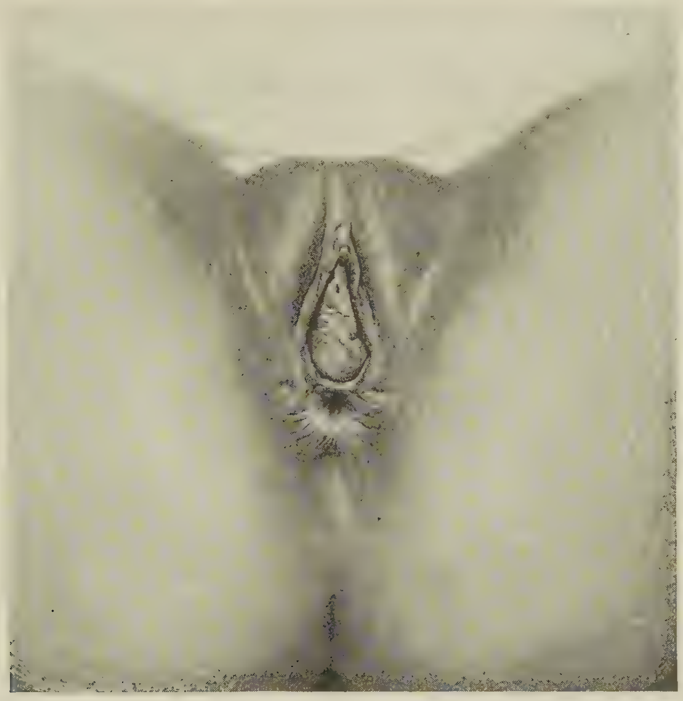

FIG. 112.—A COMPLETE TEAR SHOWING A CHARACTERISTICALLY PENTAGONAL FORM. Sometimes this is triangular. The pits of the torn sphincters are seen at the sides.

An infection acquired in the act of childbirth may spread so extensively that, if the patient survives, she recovers only with the uterine tubes adherent or distended with pus; with an endometritis of the body of the uterus; with an infection of the cervical glands (endocervicitis); a troublesome vaginitis; an infection of the vulvo-vaginal glands; or a cystitis.

Complete exhaustion of the nervous system is sometimes seen in a patient who, without any serious apparent injury, has passed through her confinement as an overwhelming experience, requiring the expenditure of all

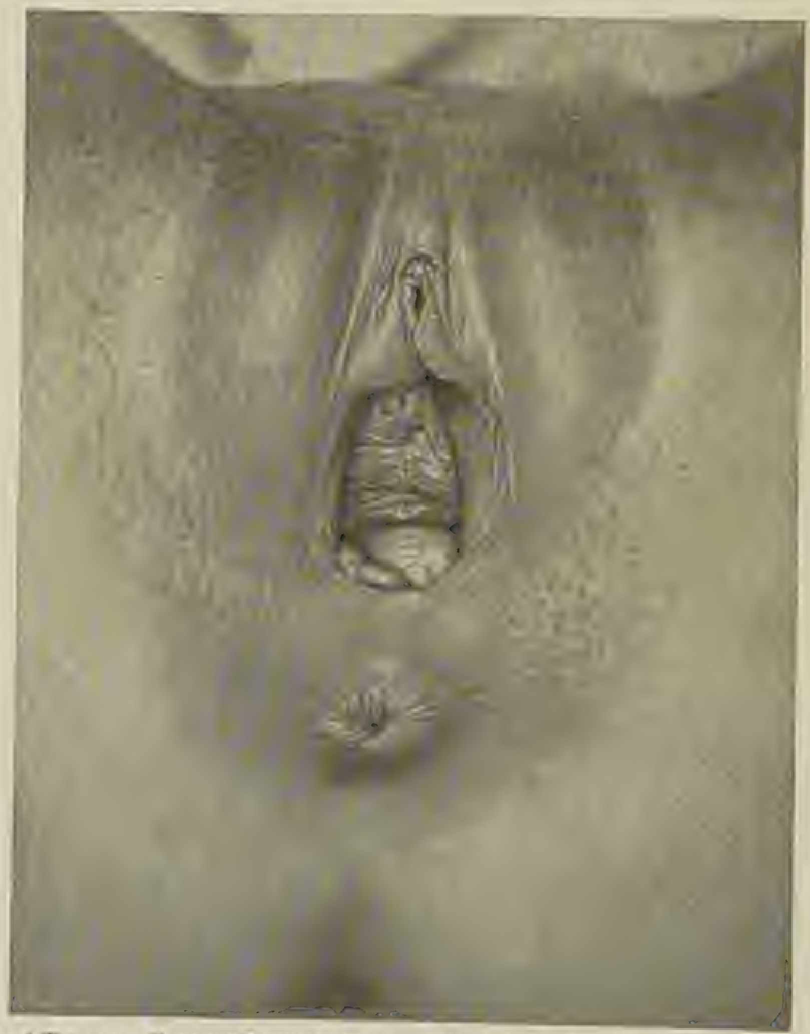

Fig. 168.—A Typically Relaxed Vaginal Outlet. The perineum is well preserved, but it is evident that the structures above have no support and the anterior and posterior walls are rolling out. Note, too, the flattening of the cleft at this point.

her individual nerve force; and, like a plant which is capable of producing but one flower and then goes to seed, she remains exhausted for years or even for her whole remaining lifetime. It is often seen in women who have borne a number of children in rapid succession. The demands made by lactation also induce nervous exhaustion in many women.

Combinations of these sequelae are often seen. For instance, a patient has extensive laceration of the cervix and of the vaginal vault; or an infection of the uterine tubes with a retroflexed adherent uterus; or a vesicovaginal fistula due to sloughing of the anterior vaginal wall with a complete tear of the perineum; or nervous exhaustion with more or less extensive mechanical injury.

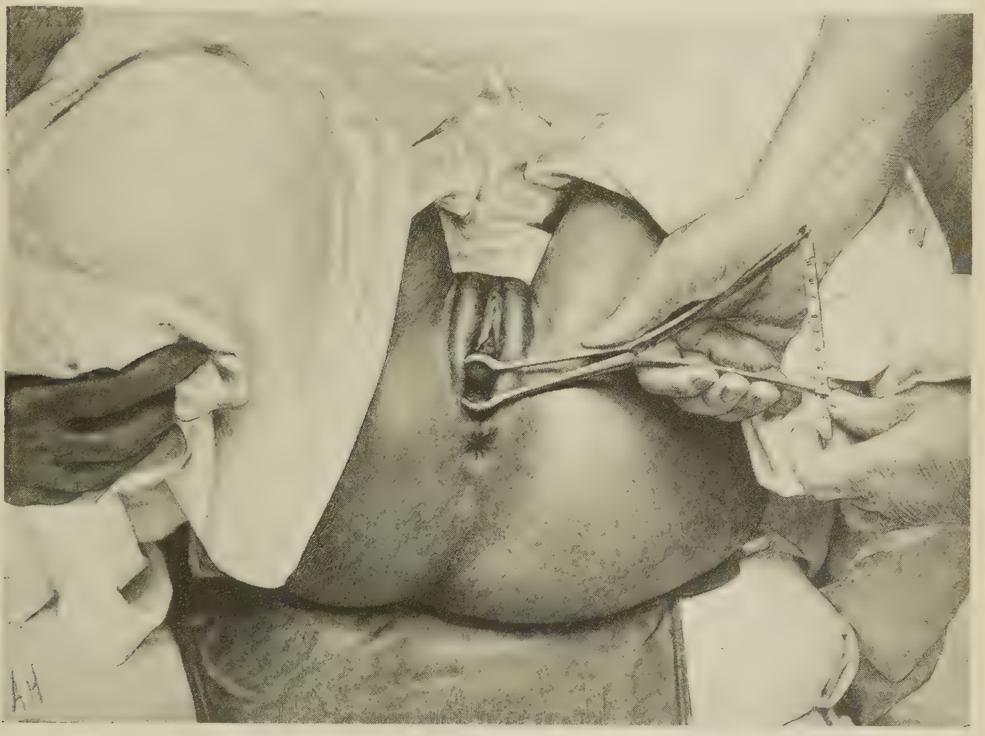

FIG. 114.—A VAGINAL OUTLET CALIBRATOR. This instrument measures the size of the vaginal outlet on the graduated rod, as the handles are squeezed together with gentle force, separating the distal end of the instrument until resistance is experienced.

PREVENTION OF SEQUELÆ.

If the general practitioner who attends obstetrical cases could anticipate and prevent these injuries, gynecological work would be greatly reduced and largely limited to the treatment of venereal diseases, tuberculosis, and tumors. Prevention does undoubtedly lie to a great extent within the power of the medical attendant at obstetrical cases, for the following conditions are more or less completely under his control:

(1) He can often prevent mechanical injuries, or obviate any ill consequences by their immediate repair.

(2) He can, as a rule, prevent an infection by his aseptic conduct of the labor.

(3) He can lessen exhaustion by timely and skilful interference.

To effect these ends obstetrics must be regarded as the one branch of medicine which constitutes a universal specialty for all physicians in general practice, and obstetrical cases must be taken more seriously than is the fashion to-day. The man who assumes the charge of an obstetrical case must never get into a hurry to have it over; he must be willing to spend his time at the bedside of his patient, and to wait as long as may be necessary for the weal of the helpless woman who trusts her life and her health to his care. He ought to be well skilled in the use of the obstetric forceps and to be fully convinced that their use may be a great evil as well as a great boon to a woman in the throes of childbirth. To make the best use of the obstetric forceps the following rules must be observed:

Use of Forceps.—(*a*) An accurate aseptic surgical technic, including a careful cleansing of the vulva and of the vaginal introitus with soap and water, followed by an antiseptic solution. A vaginal douche is not ordinarily required. The forceps must be thoroughly sterilized by boiling, and the hands of the operator, after the usual surgical cleansing, should be covered with sterilized rubber gloves.

(*b*) Successful forceps deliveries demand that the operator should have a knowledge of the normal and abnormal mechanism of labor; he must also recognize the exact position and presentation of the fetus.

(*c*) Mechanical skill and manual dexterity render the operator more efficient, but the most skilful use of the ordinary forceps cannot equal the precision of an axis traction forceps, even in less able hands.

(*d*) A practical knowledge of pelvimetry is of the utmost value. Pelvimetry need not, after all, be such a bugbear as it is. Only five or six measurements are called for, and these are always easily made with a tape measure and a pair of calipers.

(*e*) The physician must make it a fixed rule never to operate through an undilated cervix. Disregard of this rule, together with a faulty technic, is the cause of many of the disastrous forceps deliveries. The skilled operator appreciates the necessity for preliminary dilatation of the lower birth canal, and when the natural forces fail, he is familiar with the usual excellent methods available to secure such dilatation. These are, in order of their safety: Rubber bags, such as the Pomeroy and Voorhees, or, best of all, the old pear-shaped bags of Champetier de Ribes; manual methods, such as those of Philander A. Harris and J. Clifton Edgar; and the graduated metal dilators of the Hegar type. Next to rigid surgical cleanliness, I know of nothing which contributes to the safety of forceps deliveries so greatly as the securing of complete dilatation of the lower birth canal prior to the application of the forceps.

In cases of eclampsia, where immediate delivery seems paramount to every other consideration, the medical attendant must not allow himself to yield to the natural temptation to grasp a foot as soon as it can be felt, and drag it through the undilated cervix. It is best to finish the dilatation with the fingers while the patient is under the influence of the chloroform. There are two methods of finger dilatation: That of Harris (*Amer. Jour. Obst.*, 1894, vol. 29, p. 37), by stretching the cervix through the introduction of the index finger and the thumb, which is best when the head is well up; and that of Edgar ("Obstetrics") by pulling the cervix apart, which is better when the head is low down on the cervix.

The obstetrician will do well to make use of high forceps operations but rarely, and when it is necessary, to use an axis-traction instrument, like the Tarnier. The physician who uses the axis-traction forceps ought to have a clear mental picture of the direction of the pelvic axis in which the head lies at any particular moment; in general, he first pulls down towards the pelvic floor, then out under the pubic rami, and then upwards. The alternative is to wait with patience for a considerable period, so as to give the cervix a long time to dilate, and the head time to accommodate itself by moulding its form to the pelvic canal. Serious harm is often done through trying to assist nature overmuch by working the cervix back over the head, or by stretching it with the fingers. If the head gets wedged at any point, an injudicious use of the forceps will cause a slough, which, as a rule, extends through into the bladder, or sometimes into the rectum. In J. W. Williams' clinic at the Johns Hopkins Hospital the custom is to interfere if the head remains wedged in one place for two hours. Good evidence that the frequent use of the forceps is really an abuse is afforded by the fact that so many excellent practitioners, especially in country districts, manage hundreds of cases without resorting to them in a single instance. When it is really necessary to use forceps, it is usually possible to avoid injury to the bladder by first emptying it with a catheter; a rubber one is best for this purpose. My associate, Dr. G. L. Hunner, was once called upon to take a glass catheter out of a woman's bladder; it had been broken off by the descent of the head in a pain which came on as the bladder was being emptied.

It is also important that the physician should not be in a hurry to determine the third stage of labor. He should give the placenta at least an hour to effect a delivery, and previous to this time should not do more than use moderate force in pushing down from above. If the placenta is not delivered into the vagina by this time, it may be attached to the uterus as the sequel of an endometritis. The best method to remove it then is by introducing the gloved hand into the uterus and using the edge of the hand as though it were a knife, to scoop or cut the placenta off from the uterine wall. The cord should never be pulled upon as a means of delivery.

Protection of Perineum.—The perineum is best protected by restraining the head from passing suddenly and precipitately through the outlet under the force of a violent expulsive pain. Precipitate delivery through the vagina and the vulvar ring is especially likely to occur during forceps deliveries. Rupture of the perineum can best be prevented by one of two methods. The first of these depends upon the judicious use of chloroform; when the head reaches the vulva and begins to distend the ring of the vaginal outlet, two or three drops of the anesthetic with the first pain, four or five with the next, and so on until the head escapes, by which time the patient is completely anesthetized. The other method is by resistance of rapid dilatation of the outlet and expulsion of the head. This is accomplished by making pressure upward and inward, holding the head back and so, in part, preventing the powerful propulsive force of the uterus above the body. In making such pressure, a gauze pad should be placed on the perineum. Precipitate delivery through the vagina and the vulvar ring is especially liable to occur during forceps deliveries. The head must never be extracted from the vulva by one effort of traction; it should be brought down slowly and deliberately, as far as possible after nature's method, either by allowing it to return between the pains and come down a little further next time, or by removing the forceps and letting nature finish her work unassisted. Hasty obstetric work is a source of much danger to parturient women, just as it has ever been since men discovered how to assist nature in this respect. Obstetricians do not lay stress upon shoulder tears.

Immediate Repair of the Perineum.—If the perineum is deeply torn it is wisest to sew it up at once. It is the practice at the Johns Hopkins Hospital to close the perineal tear after the birth of the child and before the delivery of the placenta. This is a good plan, because it keeps the physician actively engaged, it saves time, and it tends to greater deliberation in dealing with the placenta. In order to repair the perineum, the patient is brought to the edge of the bed, after which the wound is exposed with retractors, and then closed with silkworm-gut sutures, extending, when necessary, up each vaginal sulcus and on the perineal surface (see Figs. 115 and 116). If the injury goes through into the bowel, the sutures on the bowel surface must be passed with special care in order to secure an accurate approximation (see Fig. 118). The sutures in the perineal wound should not be tied tight, in order to allow for swelling of the tissues. Tight sutures are apt to cut through into the wound itself. Each suture should be passed about one-third of an inch from the margin of the wound; for doing this I use a large curved needle, held in a strong needle holder, armed with a silkworm-gut suture. This is passed from one side well down to the bottom of the wound and then up and out at a corresponding point on the opposite side of the tear (see Figs. 117 and 118). Two or three of these sutures are sufficient to close a large wound; it is a mistake to put in a number of sutures, as in the secondary operation. It does no harm to allow for a little drainage between the sutures. The sphincter ends are best united by a suture of silkworm-gut, which transfixes the muscle and passes up through the vagina. The remainder of the perineal and vaginal wound is closed by a series of interrupted silkworm-gut sutures.

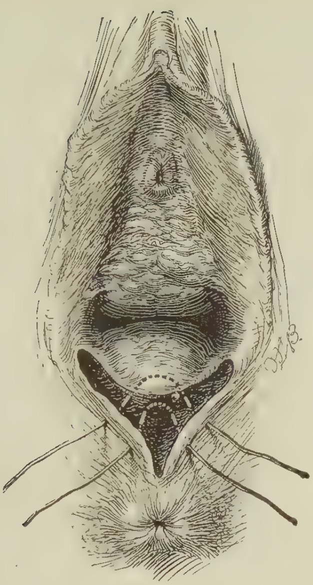

Fig. 115.—A Partial Tear of the Perineum Extending up Both Sulci and Out onto the Skin Surface. Two sutures passed as shown in Fig. 115 serve to unite the torn surfaces.

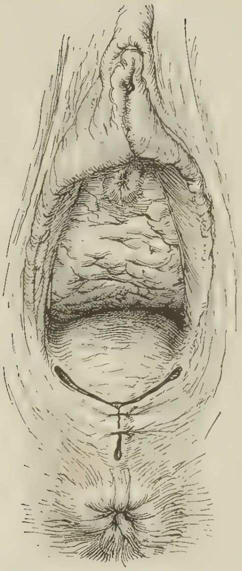

Fig. 116.—The Sutures Tied and the Torn Surfaces United.

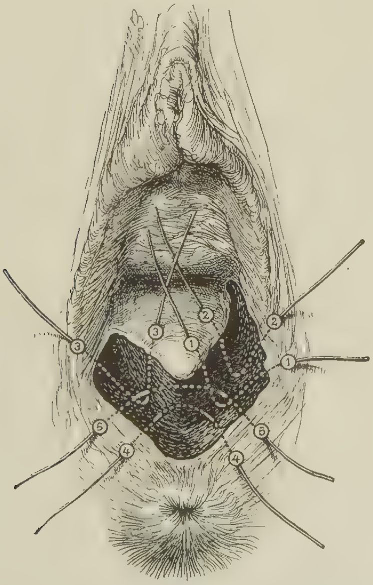

Fig. 117.—A Deeper Tear of the Perineum Extending Farthest up the Left Sulcus. The surfaces are best united by passing silkworm-gut sutures in the order indicated, and then tying them snugly together.

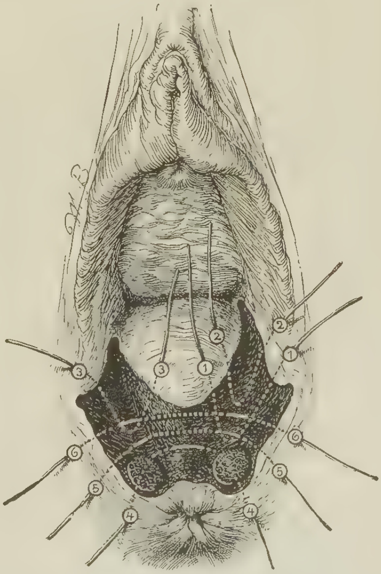

Fig. 118.—A Complete Tear of the Perineum Involving the Sphincter Muscle. Sutures should be passed in the order indicated. Suture 4 transfixes both ends of the sphincter and serves to unite them.

Repair of the Cervix.—If a persistent hemorrhage occurs in the presence of a well-contracted uterus, a torn cervix should be suspected. Its existence can be demonstrated by bringing the patient to the side of the bed and retracting the perineum, at the same time catching the anterior and posterior lips of the cervix with forceps and pulling them together. A bright stream of blood is sometimes visible between the lips of the tear. Repair is effected by passing two or three chromicized catgut sutures with a stout curved needle and tying them at once.

Precautions against Infection.—The obstetrician must give minute attention to personal cleanliness. It would be well if it were a rule for all obstetricians to wear thin rubber gloves, and to make as few examinations as possible during the course of a labor. For some eighteen years it has been my own habit to wear a sterilized suit of clothes when attending an obstetric case; if this is too much to ask of the general practitioner, he might at least wear a sterilized gown, and this precaution, together with the use of rubber gloves, and the surgical cleanliness of the field of operation would relieve him from much of the responsibility which must always arise in connection with puerperal infection (see Fig. 119). The man who attends obstetrical cases ought to be extremely careful about coming in contact with infectious material between times. For example, he should never examine a puerperal infection unless protected by rubber gloves, and in driving he should wear gloves which can be washed and boiled. The use of an obstetric cushion, especially among the poorer class of patients, is valuable in the conduct of labor, as it always leaves the bed clean and minimizes the amount of washing to be done afterwards. The cushion ought to be covered with a sterile sheet, and as the amnion escapes, it can be dried up with a sterile cloth or absorbent cotton. If the cushion becomes infected, it can be sterilized by boiling or by soaking in a strong antiseptic solution (bichloride of mercury, 1:1000).

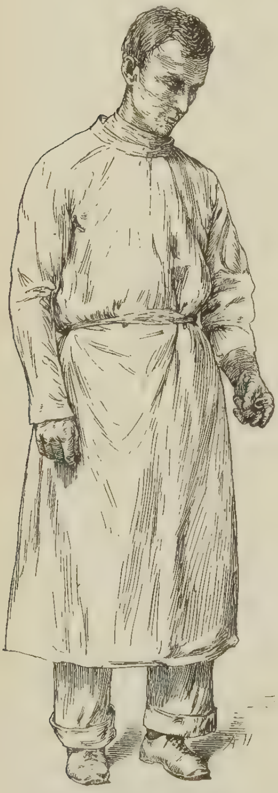

Fig. 119.—The Physician Dressed in a Sterile Gown with Examining Hand Protected by a Sterilized Rubber Glove Ready to Attend and Examine a Patient in Labor. Instead of a sterile gown a sterilized linen coat may be worn. The gown gives more perfect protection to the patient.

Use of the Catheter.—If it is necessary to catheterize the bladder after labor, the greatest care must be exercised to have a clean well-boiled catheter (No. 3), to cleanse the orifice thoroughly with clean warm boric acid solution before introducing it; and then to insert it with the greatest caution under direct inspection, taking pains to avoid trauma.

The nurse or the physician who handles the catheter ought never to touch the end which enters the bladder.

Choice of a Nurse.—The nurse is a potent factor in the weal or woe of the obstetric patient. Careless midwives, who go from place to place, indifferent to all considerations but the fee which they expect to receive, often carry with them the seeds of infection, and their progress might easily be traced by the funerals which follow in their train. In this country we stand greatly in need of a well-trained corps of midwives, regulated by proper laws; such a body of women, in fact, as is found at present only in Germany. The physician ought, at least, to know about the cases a nurse has recently attended. He should be sure that she has no infectious disease, no ozena, nor any sore about her person; he should assure himself that she is not meddlesome nor anxious to give douches, and that she is fully instructed in the details of the correct antepartum toilet of her patient, as well as in the surgical care of the genitalia and of the breasts.

CHAPTER XX.

FIBROID TUMORS.

Definition, p. 464. Structure, p. 464. Classification, p. 465. Frequency, p. 469. Etiology, p. 470. Life history, p. 470. Degeneration, p. 471. Complications, p. 472. Symptoms: Hemorrhage, p. 473; pain, p. 474; leucorrhea, p. 474; anemia, p. 474. Diagnosis, p. 474. Effect upon neighboring organs, p. 479. Effect upon distant organs, p. 480. Treatment: Electricity, p. 483; ergot and hydrastis, p. 484; stypticin, p. 484; thyroid extract, p. 484; gelatin, p. 484; hot douches, p. 484; packing for hemorrhage, p. 485; intra-uterine treatment, p. 485; curettage, p. 486; general considerations, p. 486. Fibroid tumors and pregnancy, p. 486.

DEFINITION.

Fibroid tumor, myoma, or fibromyoma of the uterus is a nodular growth, springing from some portion of the uterus, usually, but not always, above the cervix, and varying in size from a microscopic node to a mass or masses filling the pelvic and abdominal cavities; the largest fibroid on record is one removed at autopsy by William Hunter, which weighed one hundred and forty pounds.

STRUCTURE.

Fibroid tumors are generally rounded in shape with a smooth exterior; they are single or multiple (as many as a hundred and fifty have been found in one uterus, see Bland Sutton, *Brit. Med. Jour.*, 1901, vol. 1) and of a firm consistency, though a predominance of muscular tissue in their structure, or the presence of degenerative changes, may render them softer. They are made up of tissues similar to those composing the myometrium, namely, unstriped muscle and connective-tissue fibres. On section the tissues are seen to be arranged in a disorderly interlacement of muscular and connective fibres, which in the larger masses are grouped in more or less definite whorls, somewhat resembling knots in a piece of wood. Between the groups of fibres run arteries, veins, and lymph channels, derived from the normal vessels of the uterus, which at first ramify beneath the capsule of the tumor and then plunge directly into its interior. The individual tumors are encapsulated in the uterus, in such a manner that they can be shelled out without tearing the walls. They are classed as "benign tumors" because they do not penetrate and ramify throughout the surrounding tissues, nor cause destruction by metastases. These tumors, as a rule, are poorly nourished, because they derive their blood supply from the surrounding constricted uterine tissue, but occasionally they are supplied by large vessels formed in the adhesions between them and surrounding organs.

CLASSIFICATION.

Fibroid tumors may be classified according to their component parts, those containing an excess of muscular tissue being called myomata, those in which connective tissue predominates, fibromata or fibroids. There is still another group, called adenomyomata, characterized by presence of glands similar to those found in the uterine mucosa. These tumors are frequently diffuse and may or may not be definitely encapsulated. Fibroid tumors are further classified according to their situation in the uterus, as follows: (1) Subserous, including (*a*) intraligamentous tumors and (*b*) tumors of the cervix; (2) interstitial; and (3) submucous. They are also classified by their number and size, for instance, a multiple

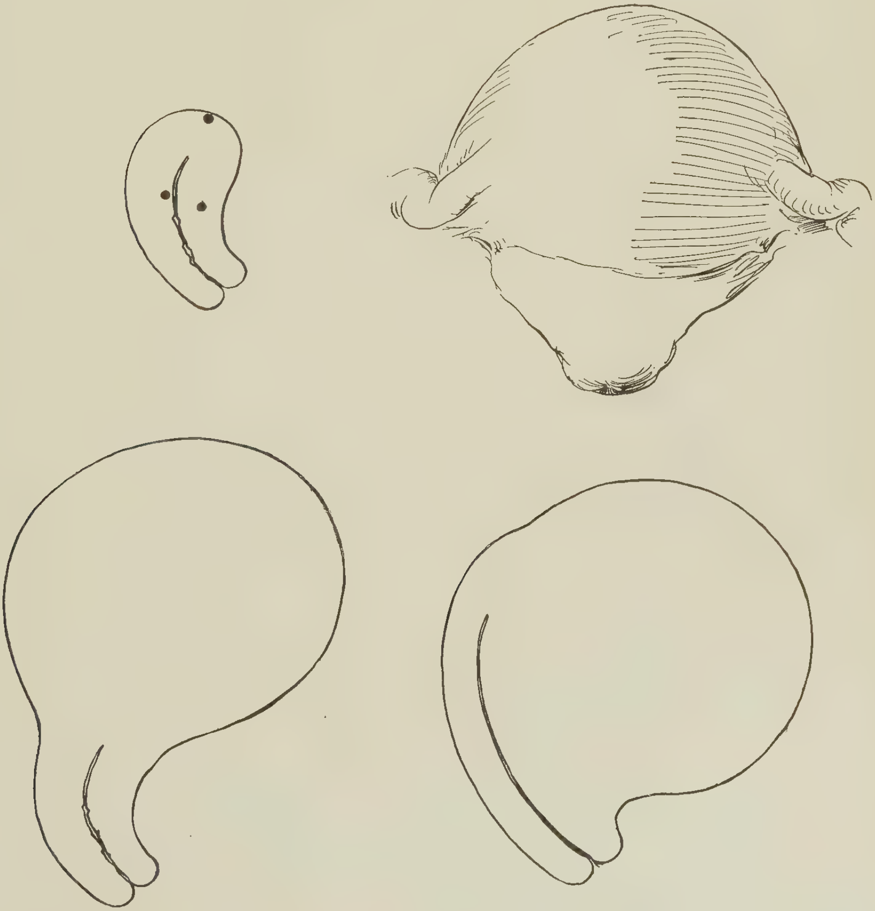

Fig. 120.—Illustrates How the Location of a Myoma May Determine the Form which the Myoma Assumes. The upper left hand figure shows three typical points of origin. The upper right hand figure shows a myoma developing from a focus in the posterior wall. The lower right hand figure shows one developing from a focus in the anterior wall. The lower left hand figure shows one developing from a focus in the fundus.

fibroid, a large interstitial fibroid of the posterior uterine wall, a small fibroid of the anterior wall, and a small subserous fibroid springing from the fundus uteri.

Subperitoneal Fibroids.—All fibroid tumors originate in the uterine muscle, therefore they are interstitial in the beginning (see Fig. 120), but if the tumor develops in the outer wall of the uterus and grows upward under the peritoneum it is called a subperitoneal fibroid (see Fig. 121). In such growths the greater part of the periphery is outside the uterine wall and they have no considerable amount of covering of uterine tissue. Their size is large or small relatively and, as a rule, the greater the size of the tumor the more is it separated from the uterus. If, instead of developing under the serosa, the tumor separates the folds of the broad ligament, it is called an intraligamentous tumor. These tumors have the greater part of their circumference outside of the uterus and are not covered by uterine tissue. Noble ("Gynecology and Abdominal Surgery," Kelly and Noble, 1907, vol. 1, p. 669) states that he found this variety of fibroid tumor in three and a half per cent of two thousand two hundred and seventy-four cases of fibroids examined by him. Tumors originating in the lower posterior segment of the uterus and growing first into the cervix and then into the posterior pelvis possess the same characteristics, as well as those rare growths which begin in the cervix itself and develop away from the uterus. The cervix, it is true, has no covering of peritoneum, but as the tumor increases in size and rises in the pelvis it pushes the peritoneum before it, and therefore this class of tumors may be included among the subserous. In all subperitoneal fibroids the shape of the uterine cavity is little if at all altered.

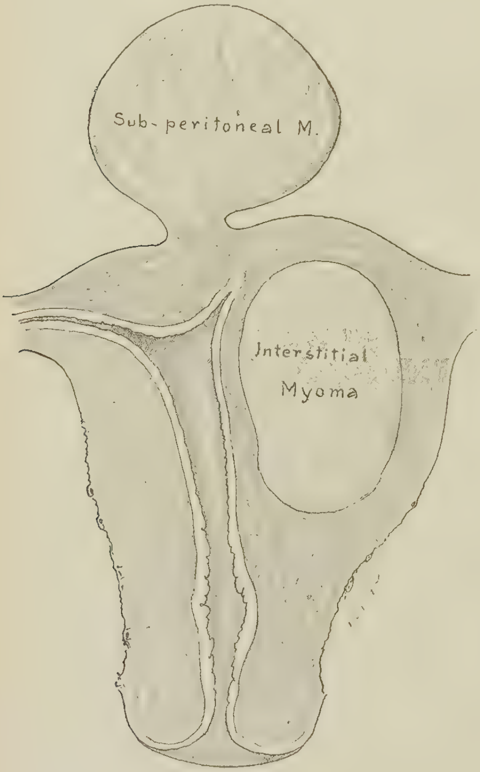

FIG. 121.—DIAGRAM SHOWING PEDUNCULATE SUBPERITONEAL, AND INTERSTITIAL TYPES OF MYOMATA.

Interstitial Fibroids.—(Intramural or intraparietal.)—These tumors are situated in the wall of the uterus and surrounded by a covering of uterine musculature. They may or may not alter the external contour of the uterus, but the uterine cavity is almost always lengthened, broadened, and often rendered asymmetrical by them. The fundus of the uterus in the case shown in Figure 122 was lifted as high as the umbilicus and the canal proportionately lengthened. They sometimes develop into the uterine cavity and are covered by mucosa with little if any of the uterine musculature (see Fig. 123).

Submucous Fibroids.—Of all three varieties of fibroid tumors, the submucous occasion the greatest changes in the shape and dimensions of the uterine cavity. In a large tumor, starting in the lower part of the uterus, the distortion of the uterine canal may be extreme. The pressure exerted by the tumor on the nervous mechanism of the uterus excites reflex uterine contractions, which by their expulsive power cause the tumor first to become pedunculate, after which the pedicle elongates until the internal os is dilated, and, in favorable cases, the tumor is delivered. More often, however, necrosis of the tumor sets in before delivery is accomplished and we have a sloughing fibroid. A pedunculate submucous fibroid, if small, is

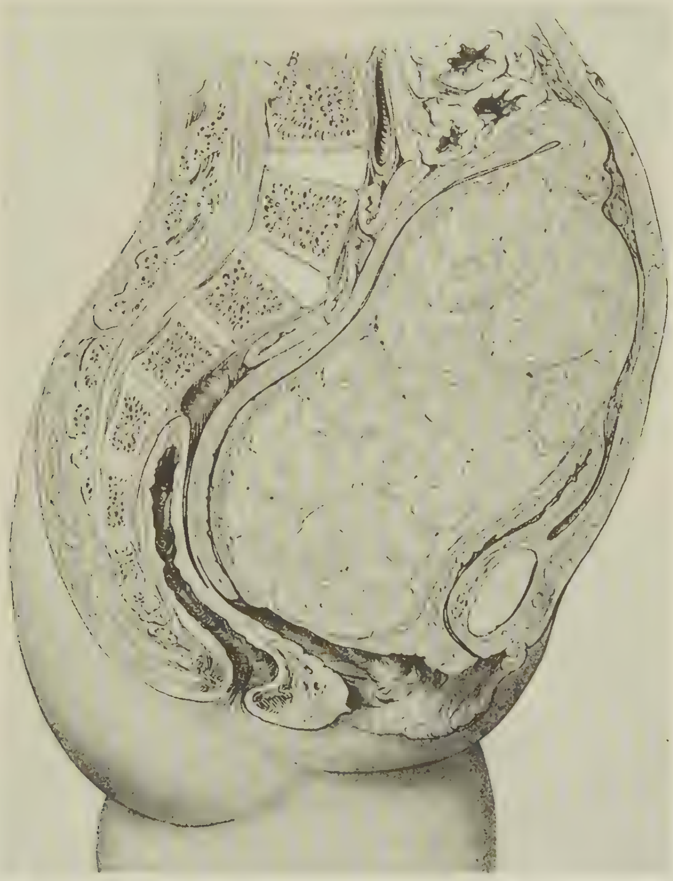

Fig. 122.—An Interstitial Myoma Growing in such a Manner as to Distort the Cervical Canal and Enormously Lengthen the Canal of the Uterus.

called a fibroid polyp and must be distinguished from a mucous polyp, which is one of the manifestations of glandular endometritis. The German authorities maintain that the mucous membrane of the corpus uteri shows evidence of glandular and interstitial endometritis in all forms of fibroids and especially the submucous variety. Cullen, however ("Cancer of the Uterus," 1900, p. 535), denies this opinion, stating that the mucous membrane in fibroid tumors is generally normal; but, he adds, "it must be borne in mind that polypi may also be present" (see Fig. 124); he further notes that there are various degrees of atrophy, and of glandular hypertrophy, and that mild degrees of endometritis are sometimes present. In many fibroids the endometrium shows signs of hypertrophic changes, while in others it is atrophic.

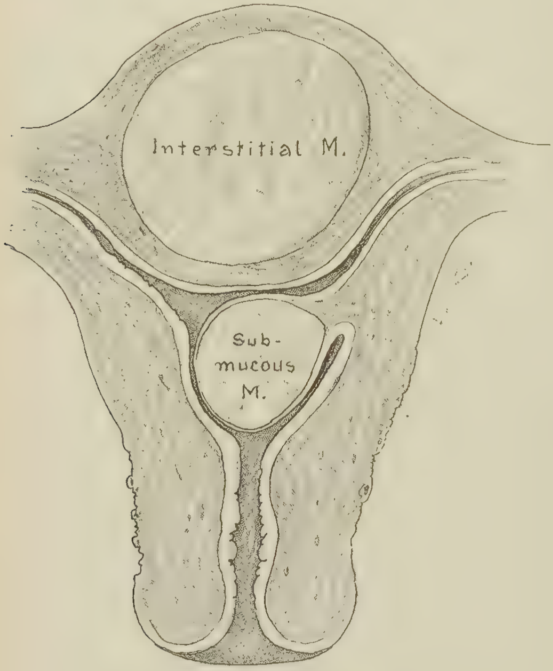

FIG. 123.—DIAGRAM SHOWING SUBMUCOUS AND INTERSTITIAL TYPES OF MYOMATA.

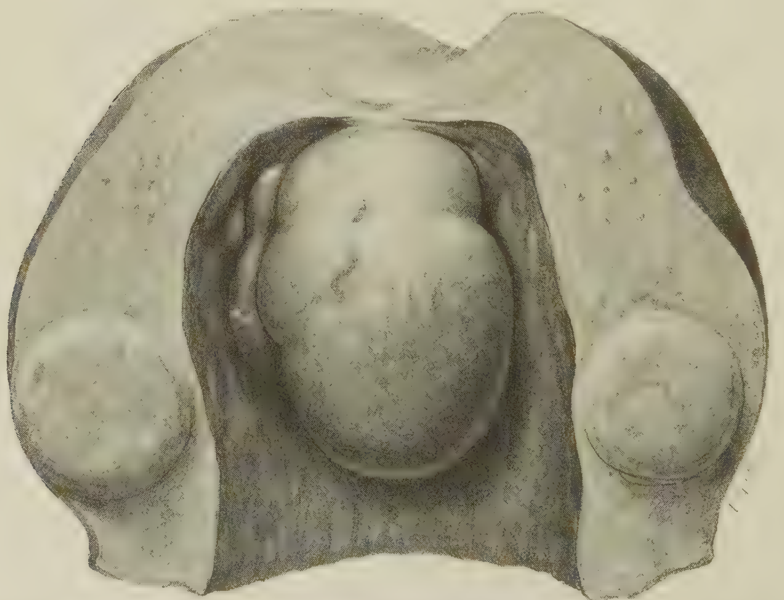

FIG. 124.—UTERUS AMPUTATED AT THE INTERNAL OS AND LAID OPEN, SHOWING INTERSTITIAL MYOMATA IN THE BODY AND AT THE FUNDUS A POLYP.

SITUATION.

Fibroid tumors always develop in the substance of the uterine wall, originating much oftener in the body than in the neck and more commonly in the posterior than in the anterior or lateral wall (see Figs. 125 and 126).

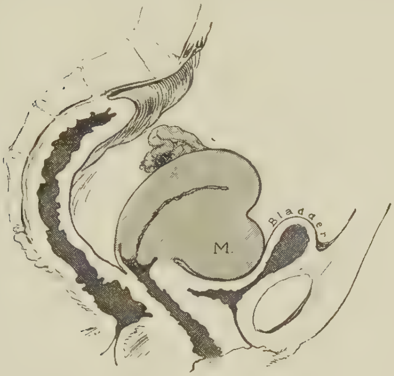

Fig. 125.—Showing a Myoma in the Anterior Wall of the Uterus and Its Effect upon the Bladder.

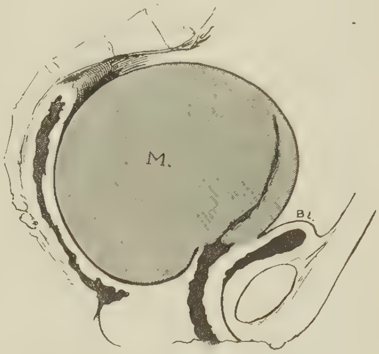

Fig. 126.—Showing Large Myoma in Posterior Wall.

FREQUENCY.

Fibroid tumors are the most common of uterine growths. The relative number of women with fibroids was stated by S. H. Bayle (*Dict. en 60 tomes,* Paris, 1813, vol. 7, p. 73), as long ago as 1813, to be twenty per cent of all who were over thirty-five years of age, and for many years his statistics were generally accepted. Others, however, have arrived at different results; J. M. Klob, for instance ("Path. Anat. Female Sexual Organs," Eng. transl., 1868, p. 177), asserts that forty per cent of the uteri of women dying after their fiftieth year contain fibroids; the *exact* frequency of these growths, therefore, has yet to be determined, but one fact definitely established is that they occur most often during the period of sexual maturity, that is, between the ages of thirty and fifty, being rare before twenty and after fifty-five years of age. Gusserow (Hart and Barbour, "Manual of Gynecology," 1904, p. 424) found that out of nine hundred and nineteen cases of fibroids there were only fifteen under twenty years of age and only seventeen over sixty; the highest percentage, thirty-eight and eight-tenths, was between the ages of thirty and forty, while the next highest, thirty-six and seven-tenths, was between forty and fifty. It was formerly supposed that fibroids were almost invariably present in the negro race after the thirtieth year (T. G. Thomas, "Diseases of Women," 1872, p. 485), but more recent observers are of a different opinion; J. W. Williams, who represents the extreme reaction from this opinion, found them only two per cent more frequent in negroes than in whites in three hundred and seventy-five cases analyzed by him at the Johns Hopkins Hospital.

It is not yet determined whether fibroids are more common among single women than married; Bayle (*loc. cit.*) and other authorities thought that they were, while Gusserow, Dupuytren, West, and others held that they were not.

ETIOLOGY.

The etiology of fibroid tumors is still shrouded in mystery, although the problem has been studied assiduously by many investigators during the last fifty years, amongst whom are Klebs, Kleinwächter, Gebhard, Connheim, Virchow, and Gottschalk; many hypotheses have been advanced, but, so far, none has been proved. An ingenious theory, recently advanced, is that of A. Claisse (*Thèse de Paris*, 1900), which attributes them to an infection of the uterine mucosa, giving rise to subacute inflammation causing proliferation of the round cells which are transformed into fibrous tissue. Heredity has been supposed to play a part in the causation of fibroids, Hofmeier, Veit, Kleinwächter, and others considering it a predisposing cause; a fact substantiated by the appearance of fibroïd tumors in different members of the same family. Sexual irritation, such as masturbation, or abnormal sexual practices, has even been assigned as a cause of myoma by Veit ("Handbuch der Gynäkologie," 1897, vol. 2, p. 452) and other writers, but while the chronic congestion arising from undue irritation of the genital organs may assist the growth of a fibroid, it is difficult to see how it could originate one. It is probable that many fibroids are of congenital origin; a plausible theory is that which tries to harmonize fibroids with other tumors by assigning them to a fetal misplacement of the tissues, according to Cohnheim's theory. Age plays the most important part in bringing about the growth of the tumors, for they almost always become manifest late in the child-bearing period. As regards race, they are undoubtedly most common in negroes. Family is undoubtedly a factor in their causation, as two, or even three sisters have repeatedly been operated upon for them.

LIFE HISTORY.

The development of a myoma may be very slow. I have known one case which was under medical observation for twenty-five years before operation and two years afterwards ("Operative Gynecology," 2d edition, 1907, vol. 2, p. 347), where a large interstitial tumor, with a uterine cavity measuring eight or nine inches, became larger, subperitoneal, and pedunculate, so that at operation it was found attached to a small uterus by a pedicle one centimetre long by three broad; it weighed fifty-nine pounds. The direction of the growth is a matter of importance, for upon the course taken its subsequent fate often depends. For instance, if it grows so as to become subserous it may become pedunculate and in course of time become separated entirely from the uterus, receiving its nourishment through adhesions to surrounding structures; such cases, however, are rare. If, on the other hand, the tumor grows towards the uterine cavity and becomes of the submucous variety it is often extruded through the external os. In either case the blood supply to the tumor is interfered with and there is danger of necrosis and degenerative changes. If the tumor remains in the substance of the uterus as an interstitial fibroid, its nourishment is established on a surer footing. It is possible for all tumors, and especially small ones, to remain in a quiescent state for an indefinite period. Bland Sutton ("Tumors Innocent and Malignant," 4th edition, 1906, p. 187) calls attention to the latent, or seedling fibroid, in regard to which he says: "If a number of uteri from women between the twenty-fifth and fiftieth years be examined by the simple means of sectioning with a knife, in a large proportion of these uteri a number of small rounded fibroids, resembling knots in wood, will appear, their whiteness being in strong contrast to the surrounding muscle tissue. These discrete bodies, in many instances no larger than mustard seeds, are in histologic structure identical with the fully grown tumors." Under these circumstances, we can never be sure when fibroids are removed at an operation that all of them have been taken out, and therefore a patient cannot be assured that other fibroids will not grow.

In some cases the tumors increase very rapidly in size. Their rapidity of growth is usually in inverse proportion to the age of the patient. The younger the patient the more rapid the rate of growth. Soft tumors grow faster than hard ones; they increase rapidly during pregnancy and diminish markedly after delivery, while after the menopause much increase is uncommon. Just before each menstrual period they become larger and decrease in size when the flow has ceased; in many instances they lessen after the menopause, but not invariably. All these facts must be kept in mind when a patient is examined at intervals to determine the relative bulk of a tumor.

DEGENERATION.

There are certain structural alterations in fibroids, the causes of which we do not know, except that sometimes they can be explained by the presence of an arteriosclerosis and a diminished blood supply. An increased formation of fibrous and hyaline tissue occurs in practically all myomata, and when the process is extensive, necrosis takes place at the centre of the growth, resulting in the formation of a cyst cavity with walls of irregular outline. Hyaline degeneration was noted in three and one-tenth per cent of two thousand two hundred and seventy-four cases of fibroids collected from literature by Noble (*loc. cit.*, p. 669). Some degree of hyaline change is exceedingly common. Fibroids may become progressively indurated, especially after the menopause; small hard tumors being found at autopsies on old women when their presence has not been suspected during life.

Calcification (the so-called "uterine stones") is rather a rare transformation; which Noble found in one and seven-tenths of his cases. It is effected by deposits of phosphate and carbonate of lime formed near the centre or the periphery of the tumor which make either a bony framework (not, however, true bone) or a shell; the tumor is rarely entirely solidified, but it must be remembered that small areas of calcification are extremely common.

Softening of a fibroid tumor may be due to several causes. Colloid or myxomatous degeneration is characterized by the effusion of mucous material between the muscle bundles and distinguished from edema by the proliferation of round cells in the interstitial tissue. Noble (*loc. cit.*) found myxomatous degeneration in three and four-tenths per cent of the cases he collected from literature. A proliferation of connective tissue becoming colloid during pregnancy has been noted by Doléris (Arch. de tocol., janv. et juin, 1883, pp. 1, 363). The diminution in size after delivery has been attributed to fatty degeneration, and Gusserow ("Die Neubildungen des Uterus," 1886) has called attention to the fact that fatty degeneration of a fibroid has been demonstrated microscopically in only three cases, those of Freund, A. Martin, and Brunnings, where there had not been resulting diminution in the size of the tumor as well. There is one form of fibroid, called lipomyomata, in which a portion of the tumor is composed of fatty tissue; such a case has been described by R. Peterson (*Amer. Jour. Obst.*, 1904, vol. 49, p. 393). Edema is often observed in fibroids and may be considered as an early stage of necrosis; it is most frequently seen in the subperitoneal tumors. Fibro-cystic tumors result from the breaking down and liquefaction of areas of degeneration in myomata, and when this degeneration is extensive on account of the fusion of the different foci, a large cyst with irregularly shaped walls may be formed.

Amyloid degeneration in a fibroid polyp has been reported in a single case by C. B. Stratz (*Zeitschr. f. Geb. u. Gyn.*, 1889, vol. 17, part 2, p. 80). Suppuration arises from infection of the tumor with bacteria derived from the intestinal canal, the genital tract, or the blood; prolonged pressure of a tumor on the bowel, or an adherent vermiform appendix may permit easy penetration of the micro-organisms. Infection, especially in the case of a submucous fibroid, may also proceed from instrumental or digital invasion of the uterine cavity for exploration or curettage. Gangrene may result from degeneration, or from torsion of the pedicle, and micro-organisms may or may not play a part in the necrobiotic process.

Sarcomatous degeneration occurred in two per cent of the cases collected by Noble (*loc. cit.*); and Winter (*Zeitschr. f. Geb. u. Gyn.*, 1906, vol. 57, p. 19) found sarcoma in four and one-third per cent of two hundred and fifty-three tumors in which sections were taken from different parts of the growth.

COMPLICATIONS.

Carcinoma occurs as an associated lesion in fibroid tumors, not as a degeneration, except in a few cases of adenomyoma where cancer has been described as springing direct from the glands within the tumor. In a study of four thousand eight hundred and eighty consecutive cases of fibroid tumor, Noble (*loc. cit.*, p. 670) found cancer in two and eight-tenths per cent; in his personal experience with three hundred and thirty-seven fibroids, cancer of the fundus was present in two and six-tenths per cent and cancer of the cervix in one and four-tenths, and as women without fibroid tumors have cervical cancer ten times as often as cancer of the fundus, he concluded that there must be a causal relation between fibroma and cancer of the body of the uterus (adeno-carcinoma of the endometrium).

Disease of the tubes and ovaries due to infection is not an infrequent complication of fibroid tumors. C. Daniel studied this subject in Pozzi's clinic (*Rev. de gyn. et de chir. abd.*, 1903, vol. 7, pp. 25, 196) and found that in most cases where the complication occurred, the ovaries, or the ovaries and tubes together, were diseased; the tubes alone were rarely affected. He collected one hundred and thirty-nine cases from literature in addition to those under his own observation and found that the tubes alone were affected thirty-two times; the ovaries alone seventy-nine times; and the tubes and ovaries together twenty-eight times. In seventy cases observed in Pozzi's clinic the most common complications of this kind were catarrhal salpingitis, purulent salpingitis, hematosalpinx, and cystic degeneration of the ovaries. In Noble's cases (*loc. cit.*, p. 668) complications in the uterine appendages or in the pelvis existed in thirty-seven per cent. In Pozzi's clinic, lesions of the tubes and ovaries occurred in fifty-nine per cent of the myoma cases. It must not be forgotten, however, that these large percentages were found among women who entered the hospital for operation for fibroid tumors, and it is hardly fair to assume that all fibroids are subject to complications to the same extent; in fact, most of the statistics founded on cases collected from the literature of the subject are open to the objection that they deal with an abnormally large proportion of fibroids which are giving rise to active symptoms.

SYMPTOMS.

The symptoms of fibroid tumors are: Hemorrhage, with its resulting anemia, pain, leucorrhea, constipation, frequency of urination, dysuria, and retention of urine, the four latter symptoms being the result of pressure on rectum, ureters, bladder, or urethra.

Hemorrhage.—The bleeding caused by fibroid tumors may be in the form of menorrhagia or metrorrhagia, but most frequently the former. It is a symptom most common in the submucous variety of tumor, less frequent in the interstitial form, and rarely seen in the subserous growths. As, however, most fibroid tumors are multiple, it is not always easy to say which form predominates in a given case of hemorrhage. The submucous tumors cause bleeding by enlarging the surface of the endometrium, the total number of square inches being increased many times in the case of large growths. Diapedesis of red blood corpuscles through the walls of the capillaries of the endometrium takes place in proportion to the extent of surface involved; but venous congestion, occasioned by the pressure of the tumor on the thin-walled veins, is supposed to be the principal causal factor in the mechanism of hemorrhage in fibroid tumors, the arteries with their thick elastic walls being better able to withstand pressure. The increase of the menstrual flow may be but slight, or it may amount to excessive hemorrhage requiring active treatment; the size of the tumor bears no relation whatever to the extent of the flow, small growths sometimes causing the greatest hemorrhage. It is a curious fact that with some women the flow is greater when they are lying down than when they are up and about, a fact exactly opposite to the usual condition of things in menorrhagia.

Anemia is such a frequent result of hemorrhage that the indications of it, as a pale face, colorless lips, eyes of pearly white, flabby muscles, a bounding but compressible pulse with increased rapidity on the smallest excitement, breathlessness, and a feeling of languor are well known to everyone. The red blood corpuscles may fall to one-fifth or less of their normal number (5,000,000) and the hemoglobin to thirty per cent; hemic murmurs are usually present.

Pain.—Pain may or may not be present in fibroid tumors, and when it does occur, is variable in amount; it assumes several forms: as a dull resistant pain in one or both groins or across the abdomen, a bearing-down pain, or a backache, and these varieties may exist separately or conjointly. It may be referred to the thighs or the legs in consequence of the pressure of the tumor on the sacral plexus of nerves. Pressure on a ureter may cause pain, but the rectum and bladder are generally tolerant of pressure so far as pain is concerned, their disturbance when pressed upon showing itself in derangement of function. Dysmenorrhea occurs in about twenty per cent of the cases of fibroid tumors (see Chap. IV, p. 97), the cramp-like pain being often severe. It must be remembered, however, that an uncomplicated fibroid rarely gives rise to much pain, and therefore the presence of pain, especially if severe, indicates a pelvic inflammatory complication. Pain, as a rule, arises from the pressure of a growing tumor; expulsive pains are found when the tumor becomes pedunculate and can be extruded either in part or wholly at the external orifice.

Leucorrhea.—A vaginal discharge is rare in fibroids except in the submucous form, when, if the tumor is necrotic, the discharge is malodorous. A profuse watery discharge associated with fibroids should always excite suspicion of cancer.

DIAGNOSIS.

The diagnosis of large fibroid tumors is a comparatively easy matter, but the detection of small ones is often difficult, for the symptoms are not of much assistance, except that painful and protracted menstruation with a history of sterility or of early miscarriages are suggestive of myoma. The chief reliance in diagnosis must be upon bimanual palpation and the passage of the uterine sound. The first point in diagnosis is always to determine the relation of the tumor to the body of the uterus.

Subperitoneal Fibroids.—If the tumor is a single mass, bimanual palpation will show whether it is connected with the uterus. To determine this point, the tip of the forefinger must be placed in the vagina on the cervix and the other hand on the abdomen; if, on moving the tumor with the external hand, the cervix moves at the same time, the fact of connection is established. The growth should always be outlined as accurately as possible, but the laxity and the thinness of the abdominal walls greatly influence palpation; it is easily and thoroughly done when the abdominal walls are thin and lax, but when the patient is inclined to corpulence, it may be extremely difficult. In cases where the tumors are small, the ovaries can be located and mapped out; an attempt to do this should be made in every case. If the tumor is pedunculate, it must be distinguished from an ovarian cyst, which is easy, if fluctuation can be detected; this point is determined by making firm pressure against the tumor with the finger in the vagina and tapping with the fingers of the hand on the abdomen when, if fluctuation is present, the taps will be transmitted as waves to the finger in the vagina. If the contents of the cyst are thick and semi-solid, as in the case of dermoid cysts, the fluid waves will be absent. Some ovarian cysts, it is true, are as hard as fibroids; but, as a rule, fibroids are solid, there is more than one nodule, and the nodules are of stony hardness. If the tumor, or tumors, are large enough to distend the abdomen, the uterus is drawn up in the pelvis, but this does not take place in the case of an ovarian tumor.

A pedunculate cystic myoma may be distinguished from an ovarian cyst tumor by grasping the cervix uteri with forceps and pulling it well down. The tumor is then grasped through the abdomen on its under surface and pushed up toward the diaphragm. If, the moment the tumor is displaced, the instrument in the cervix is pulled upon also, the tumor is uterine. It takes a little time and displacement before the cervix and the tenaculum forceps are pulled upon in the event of the tumor being ovarian. A careful rectal palpation reveals the pedicle of a fibroid attached to the uterus, while it shows that an ovarian cyst is lateral and replaces the normal ovary, which cannot be found.

Whenever the sound is passed, it must be with due regard to the probable direction of the uterine canal, as determined by bimanual palpation, and strict antiseptic precautions must be observed; the date of the last menstruation must always be ascertained so that pregnancy may not be unwittingly interrupted. In the case of subserous fibroids the uterine canal will not be found lengthened.

Pregnancy.—A fibroid tumor is not always easily distinguished from pregnancy, and it is still more difficult to recognize a pregnancy complicated with fibroids. The diagnosis must be made by the following signs:

(1) In pregnancy cessation of menstruation, hitherto regular; in fibroids a tendency to increase of flow.

(2) Equable enlargement of the uterus, most common in pregnancy.

(3) Softening of the uterine walls to a marked degree, while the organ itself is not larger than a three months' pregnancy; a fibroid rarely becomes cystic until larger than this.

(4) In pregnancy softening of the lower segment of the uterus (Hegar's sign, see Chap. VI, p. 137); never present in fibroids.

(5) In pregnancy discoloration of the vaginal vault; rarely present in fibroids.

(6) Increased softening of the cervix in pregnancy.

(7) Nausea and breast changes present in pregnancy; extremely rare in fibroids.

(8) When the tumor is very large the fetal heart sounds can sometimes be heard, which will serve at once to distinguish between the two.

(9) If pregnancy is present examination a month later will show enlargement corresponding to the period of time which has elapsed.

In the case of a fibroid associated with pregnancy, mistakes have been made by the best physicians, but this is usually because they have been taken off their guard, and finding an evident large myomatous uterus have neglected to inquire as to the menstrual function and other changes suggesting pregnancy.

Pelvic inflammatory exudate may complicate fibroid tumors, but is seldom mistaken for them. In such inflammation the mass is brawny and fills in the chinks of the pelvis, and there is a history of fever, even if the thermometer does not reveal its presence at the time of the examination.

Cancer of the pelvis, originating in the ovaries or the uterus, may be mistaken for fibroid tumor, but it should be differentiated by the fixity of the infiltration and the lack of definite outline in the tumor.

Ascites is occasionally associated with large tumors, and its presence is shown by the fact that a change of position in the patient causes a change in the position of the fluid, which may be mapped out by its percussion flatness.

Intraligamentous Fibroid.—This form of fibroid is situated at one side of the uterus, its situation being shown by the sound, even if it cannot be palpated; it is low down in the pelvis and can often be felt projecting into the vagina. Its mobility is limited on account of its attachments and its situation.

Interstitial Fibroid.—In these tumors the uterine enlargement may be symmetrical or asymmetrical; in the latter case the diagnosis is easy, in the former pregnancy must first be excluded (see Fig. 127). To do this the history must be carefully taken, especially as regards amenorrhea; the elastic feeling of the pregnant uterus must be sought for as well as softening of the cervix, and bulging of the anterior segment. If there is the slightest suspicion of pregnancy, the sound must not be passed. In interstitial fibroids, hemorrhage is a prominent symptom, and the uterine canal will usually be found lengthened. If the abdominal walls are tense, or the conditions for examination are not wholly satisfactory, examination under ether is advisable.

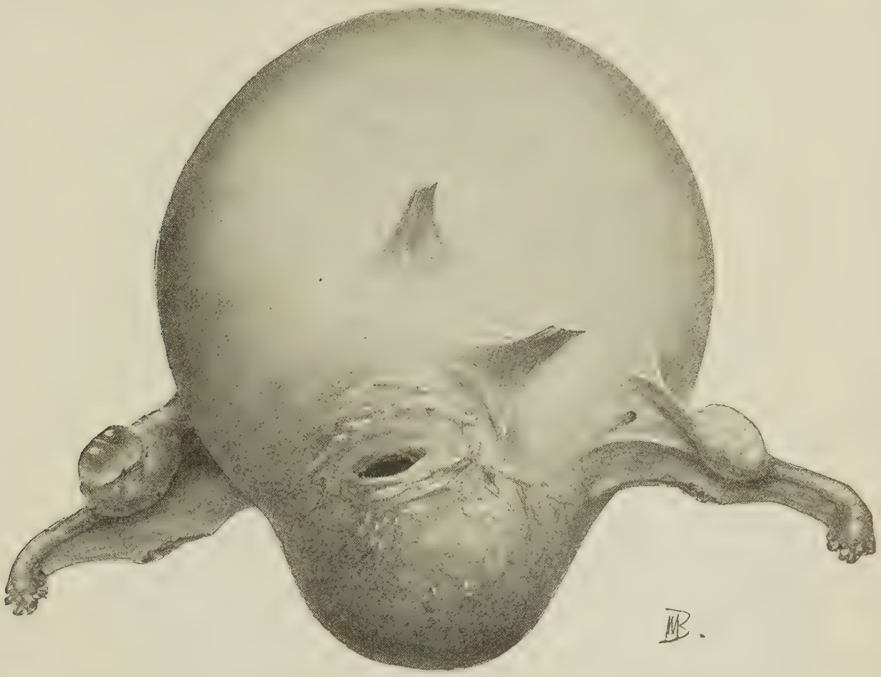

FIG. 127.—GLOBULAR MYOMATOUS UTERUS PRESENTING FORM OF PREGNANT UTERUS AT TERM, WITH ADAPTATION OF THE LOWER PART OF ITS FORM TO THAT OF THE PELVIC CAVITY. The lower part of the tumor is subperitoneal, and the cervix is displaced up to the level of the pelvic brim. Two peritoneal adhesions are shown above the cervical opening. Seen from behind. Hystero-myomectomy. Recovery. Path. No. 325. $\frac{1}{3}$ natural size.

Submucous Fibroids.—In almost all cases of submucous tumor, there is a history of hemorrhage, and bimanual palpation shows an enlargement of the uterus, even in small growths. The diagnosis is established by the sound, and, if necessary, by digital exploration of the uterine cavity. The sound shows enlargement and distention of the uterine cavity; but, if the tumor is situated at the fundus, nothing but digital exploration will decide whether it is sessile or pedunculate, although something may often be ascertained by the tactile perception transmitted through the exploring sound. If a digital exploration of the uterine cavity is to be made, the cervix may sometimes be dilated by a series of Goodell-Ellinger dilators, three sizes, followed by large Simon dilators. In cases of hard resistant cervices, however, it is best to incise the anterior wall of the cervix ("Operative Gynecology," 2d edit., vol. 1, p. 596), repairing the cervix by suture after the exploration is finished.

A sessile submucous fibroid of the fundus may be mistaken for adenoma or adeno-carcinoma; the only means of distinguishing between the two is the removal of a piece for microscopic examination.

A pedunculate tumor presenting at the external os may be mistaken for inversion, or, if it is sloughing, for cancer of the cervix (see Fig. 128). It is distinguished from cancer by ascertaining that the sound may be swept entirely around it and that the cervix itself is free from disease; and from inversion by observing, through bimanual rectoabdominal touch under ether, whether the fundus uteri is in its normal situation; moreover, an inverted uterus is usually, though not invariably, sensitive to touch.

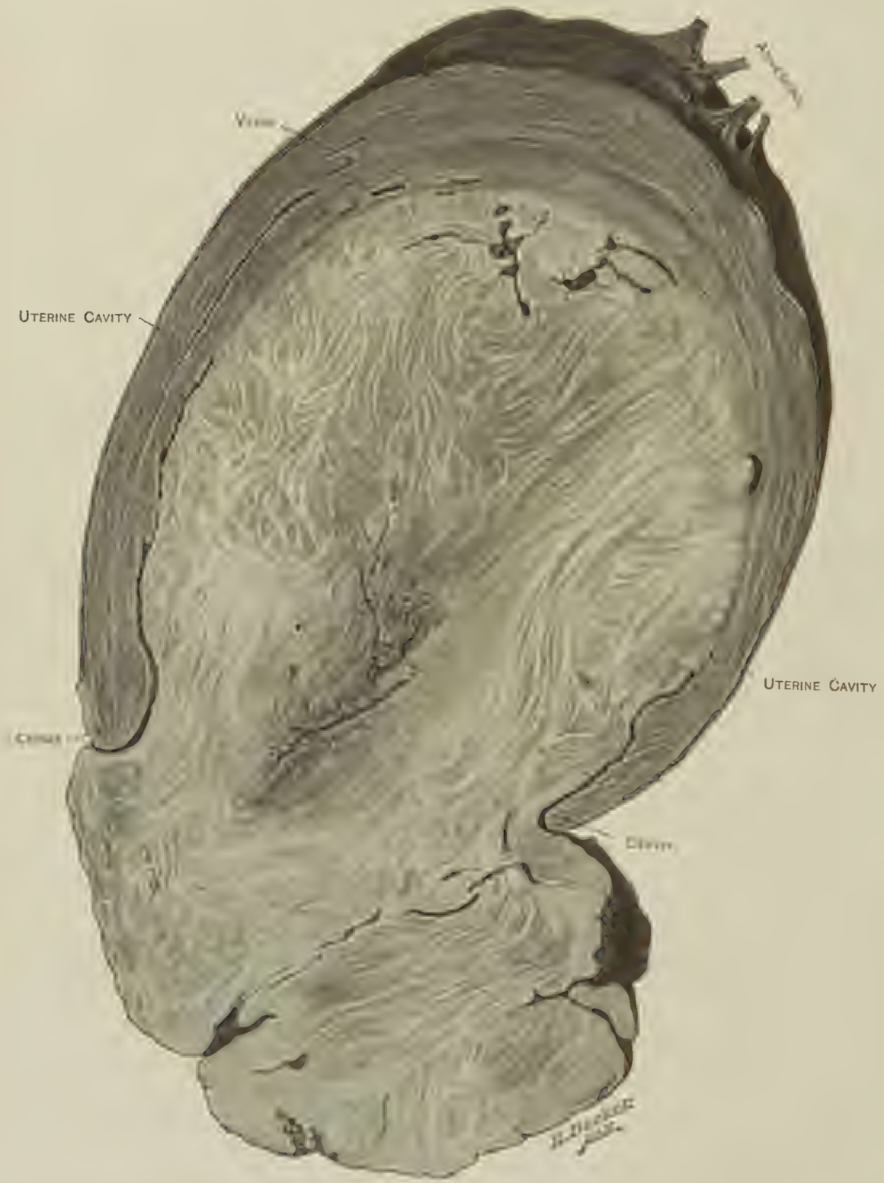

FIG. 128.—LARGE PEDUNCULATE SUBMUCOUS MYOMA PROTRUDING INTO VAGINA. The center of the tumor is necrotic.

EFFECT UPON NEIGHBORING ORGANS.

The uterus is more or less limited in its movements by its attachments to the vagina and the broad ligaments, and if a fibroid tumor develops in its substance it may displace the bladder, or press the rectum, the urethra, or the ureters against the bony framework of the pelvis. Such pressure, however, rarely causes retention of urine, because the bladder adapts itself readily to misplacement and the urethra is protected by the pubic arch (see Fig. 129).

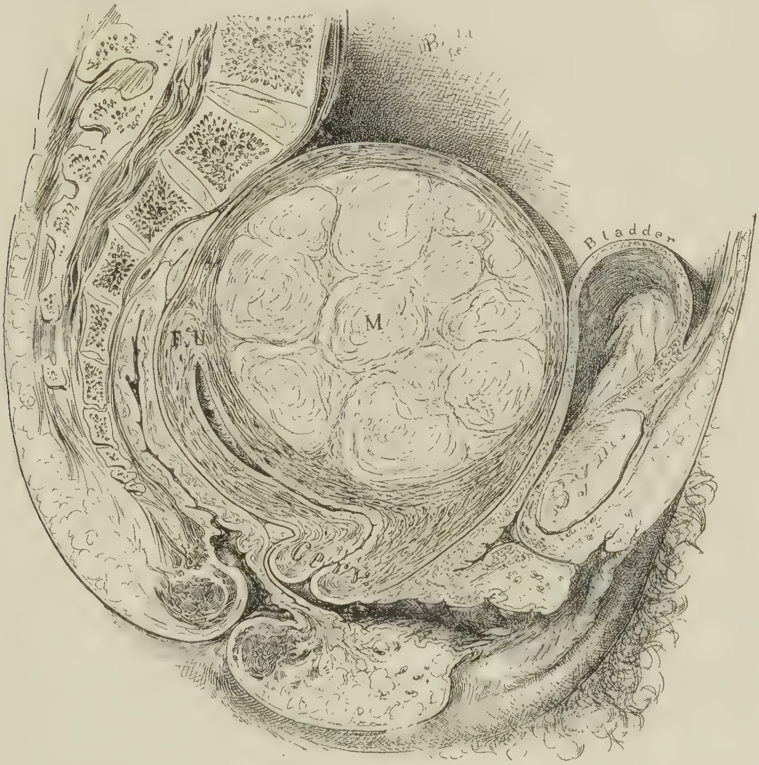

Fig. 129.—Large Myoma Developing in the Anterior Wall of the Uterus and Causing Pressure Symptoms in Both Rectum and Bladder.

Constipation from interference with the function of the rectum by pressure from a fibroid is of common occurrence, and injury of the ureters and kidneys from pressure on the ureters is much more frequent than was formerly supposed. J. H. M. Knox (*Amer. Jour. Obst.*, 1900, vol. 42, pp. 348, 496) has reported a series of cases of compression of the ureters observed during operations on fibroids at the Johns Hopkins Hospital. Of all the different forms of fibroids, intraligamentous growths and tumors developing from the cervix are most apt to compress the ureters as well as to displace them upward; they also cause the greatest amount of interference with the enlargement of the uterus during pregnancy and with delivery.

Fibroid tumors are also a cause of abortion. Lefour (*Thèse d'agrég. de Paris*, 1880) noted thirty-nine abortions, or twelve and seven-tenths per cent, out of three hundred and seven cases of pregnancy; the mother dying in fourteen; and Nauss (*Thèse de Halle*, 1882) found that abortion took place in forty-seven cases, or fifteen per cent, out of two hundred and forty-one cases.

Delivery is obstructed by tumors situated in the lower uterine segment; when they develop in the substance of the uterus, they generally interfere with involution, and may be the cause of post-partum hemorrhage and subinvolution.

The presence of a fibroid is not an absolute bar to pregnancy, nevertheless it is a frequent cause of sterility. Olshausen ("Myom und Schwangerschaft," J. Veit, "Handbuch der Gynäkologie," vol. 2, p. 765) collected statistics on the subject from nine different observers, including Scanzoni, Schröder, and Hofmeier, which showed that out of one thousand seven hundred and thirty-one married women with fibroid tumors, five hundred and twenty, or thirty per cent, were sterile. He considered this figure too high, however, because many women with fibroids only consult a physician on account of sterility, and those who become pregnant do not often consult a physician at all.

EFFECTS ON DISTANT ORGANS AND ON THE SYSTEM IN GENERAL.

Anemia.—One of the most common results of fibroid tumors is anemia, induced by prolonged and repeated hemorrhages; the hemoglobin may be reduced as low as thirty per cent, or even less, and the red cells to one million. The affection is a serious one and is sometimes difficult to correct, even after the loss of blood has been stopped. Acute hemorrhage rarely proves fatal in fibroid tumors, but the continued loss of blood produces a condition of lowered vitality and a disposition to thrombosis, embolism, or phlebitis, which, in extreme cases, contra-indicates operation for removal of the growth. Some authorities state that the hemoglobin should be at least fifty per cent before a hysterectomy is undertaken. I have operated upon twenty-three patients who were completely exsanguinated, and with a hemoglobin count below thirty and even below twenty per cent, and I have lost but two cases from this cause. It occasionally happens that several years elapse before a profoundly anemic patient regains good health after the cause of the loss of blood has been removed.

Heart Disease.—The frequency of cardiac palpitation in fibroid tumors has been noted by W. L. Burrage (*Amer. Jour. Obst.*, 1894, vol. 29, p. 320); it appears to be quite independent of actual heart lesions, there being no evidence of enlargement or of adventitious murmurs, and it is possibly the effect of anemia, in which case we should expect to find hemic murmurs. The exact relation between fibroids and heart disease, however, is not known. Certain degenerative changes in the heart and blood vessels, such as brown atrophy, fatty degeneration and fatty infiltration of the heart muscle, and chronic endocarditis, as well as sclerosis of the arteries, have been noted by different students of this point, notably Hofmeier, Fenwick, Strassman, Lehmann, Boldt, Pellanda, Winter, and Fleck, cited by Noble (*loc. cit.*, p. 671). Winter found the heart itself perfectly normal in sixty per cent out of two hundred and sixty-six cases examined with reference to this point by a specialist in internal medicine, valvular disease was present in but one per cent, and dilatation and hypertrophy in six per cent. It is difficult to see how lesions of the heart can be caused by fibroid tumors of the uterus, and I think we may agree with Winter that, in the present state of our knowledge, almost all the cardiac symptoms associated with fibroid tumors should be attributed to consequent derangement of the nervous system or to grave anemia. It is well to remember, however, that heart disease may accompany fibroids, though not in a causal relation.

Immediate Danger to Life.—Fibroid tumors may under certain conditions be a direct menace to life. C. Pellanda ("La mort par fibromyomes utérins," Lyon, 1905) states that out of one hundred and seventy-six fatal cases of fibromyomata studied by him, death was due to hemorrhage in six and four-tenths per cent. Acute abdominal emergencies of different kinds, arising from infection of the tumor, are by no means unknown. Rupture of the uterus, due to obstruction of labor by fibroids, has been known to occur. As a rule, however, fibroid tumors endanger life indirectly by their degeneration and their complications which interfere with the function of distant organs and by their effect upon the general health. They can also destroy life by pressure on the ureters, by cardio-vascular changes, and by septic infection, as well as by embolism. A serious complication is a bad pelvic inflammatory disease.

TREATMENT.

It is now generally agreed that the only curative treatment for fibroid tumors is surgical in its nature; therefore, all other forms of treatment may be classed as palliative, though they are none the less important on that account. Fibroid tumors, as I have said, increase in size just before menstruation when pelvic congestion is greatest, and diminish in size after it is over, when the congestion is past. Anything, therefore, which lessens pelvic congestion and consequent engorgement decreases the size of the tumor. This fact is the basis of the treatment of abdominal tumors by irregular practitioners, who give the patient powerful cathartic pills which cause violent purging. In a case of this sort under my observation, a woman with a large abdominal tumor had been taking such pills until she had an exfoliative enteritis; the tumor was much reduced in size while she was taking the pills, and she was told by the quack who prescribed them that the tissue passed per anum consisted of portions of the growth cast off in that manner, an opinion which satisfied the poor soul, though she was growing weaker daily.

The determining factors in the treatment of fibroids are:

(1) The situation and size of the tumor.
(2) Complicating conditions such as carcinoma, pelvic inflammatory disease and ovarian tumors.
(3) Hemorrhages.
(4) Pain.
(5) Rapidity of growth.
(6) Symptoms of degeneration.
(7) Age.
(8) Pressure signs.
(9) Undue mental distress on account of the tumor.

There is in these days a tendency to exaggerate the seriousness of the complications and degenerations of fibroids, and those who promulgate these teachings are wont to recommend the removal of all fibroids.

Rest and Care.—It must always be understood in the treatment of fibroids that a fibroid tumor without complications and not giving rise to symptoms does not require any treatment at all. In cases where the only symptom is an excessive menstrual flow, rest in bed for several successive days at each menstrual period, systematically carried out, will be found to control the loss sufficiently to postpone serious anemia indefinitely.

Every woman with a fibroid tumor should be seen and examined by a physician about every six months so that changes in its situation, density, and size may be noted, as well as the presence and effects of hemorrhage and pain; under such conditions most fibroids are really benign tumors. Not by any means every fibroid requires operative treatment, though what we now know of the associated malignant changes in the uterus has greatly increased the indications for operation and brought them nearer to the indications for it in the case of ovarian tumors.

A subperitoneal tumor of small size, if it causes no symptoms, requires no treatment, although it should be carefully watched. If it increases in size and becomes wedged in the pelvis, or if it causes retroversion by traction on the uterus, it should be pushed up into the abdomen by bimanual manipulation, with the patient in the knee-breast posture, traction on the cervix being made at the same time with a tenaculum. By this means the uterus is replaced and pelvic congestion, a condition favoring enlargement of the growth, is lessened. In some cases of this kind it is well to fit a pessary to keep the uterus in place and to prevent the return of the fibroid to the pelvis, especially if the patient is near the menopause; it must be understood, however, that should evidences of degeneration, tenderness, or softening appear, the pessary must be removed.

An interstitial or a submucous fibroid should receive the same treatment. In the event of hemorrhage or of severe pain much benefit may be derived from the use of intra-uterine galvanism.

Electricity.—For many years electricity was supposed to have a selective effect on the tissues composing a fibroid. As far back as 1869 Ciniselli of Cremona (*Mém. presenté à la soc. de chir. de Paris*, 1869) published the results of his treatment of fibroids by the electro-chemical method, in which the galvanic current was passed through the tumor by means of two needles, inserted into it through the vagina. Cutter, in America, Keith, in London, and Apostoli, in Paris, were the chief advocates of the electrical treatment in the last thirty years of the nineteenth century. Their treatments were intra-uterine and made by puncture. Galvanism was used as high as two hundred milliampères. There is no positive evidence that electricity causes diminution in the size of fibroid tumors, and on the other hand, the dangers attending the puncture treatment through possible injury to the bladder, the intestine, or the ureter, by the introduction of pathogenic organisms, have been manifest to all, so that this form of electrical treatment has been abandoned. The intra-uterine abdominal form, however, with small or moderate doses (ten to fifty milliampères) is of great value in controlling hemorrhage, relieving pain, and improving the general nutrition. A platinum electrode two inches in length attached to a hard-rubber stem, or a platinum electrode protected by a sliding rubber sheath is inserted into the uterus under strict antiseptic precautions. A wire gauze pad, eight inches by four, covered thickly for the depth of an inch with absorbent cotton, is soaked in hot water, soaped, and placed on the abdomen; the positive pole is connected with the uterine electrode and the negative pole with the gauze pad, after which, with the aid of a rheostat, a current of from twenty to fifty milliampères is gradually turned on. The treatment should last from six to ten minutes and be repeated every third day.

The positive pole has a drying hemostatic effect locally on the endometrium. The galvanic current improves the nutrition of the tissues of the body and thus promotes good health. La Torre (*Società lancisiana degli ospedale*, Rome, Dec. 9, 1889) found that electrical treatment stopped or diminished hemorrhage in seventy to ninety per cent of fibroid tumors; relieved or diminished pain in fifty to sixty per cent; and improved the general health in sixty to eighty per cent. Burrage (*Amer. Jour. Obst.*, 1894, vol. 29, p. 320), after treating fifty-four cases, found the pain relieved in sixty per cent; hemorrhages permanently cured in thirty per cent; and the general health permanently improved in eighty-four per cent.

If relatively small doses of galvanism are employed, the risk of causing stenosis of the uterine canal is obviated; larger current strengths are painful, cause vesicular eruptions on the skin of the abdomen, and have no beneficial effect on the tumor. Galvanism, given with a vaginal electrode, is sure to cause injury of the mucous membrane of the vagina, even with small dosages. If the uterine cavity is large and distorted, it is impossible to reach all parts of it with any electrode, no matter how ingeniously constructed; therefore, in such cases, other means for the control of hemorrhage must be employed. This treatment is the work of a specialist.

Ergot.—Hypodermic injections of ergot have been employed in the treatment of fibroid tumors since the time of Hildebrandt, who first used the drug in 1872 (*Berl. klin. Wochenschr.*, 1872, No. 25). From the known effect of ergot in causing contractions of the uterine muscles, it was supposed that the prolonged use of it could diminish the size of fibroid tumors, but years of trial and much discussion have failed to demonstrate any efficacy in this respect. As a means for the control of hemorrhage, however, ergot is of distinct value, as well as the fluid extract of hydrastis canadensis, which at one time was supposed to cause shrinkage of the tumors by its contractile effect on the blood vessels. Ergot may be given in the form of the fluid extract in doses of fifteen to twenty drops in water every two hours. The fluid extract of hydrastis is given in doses of twenty-five drops, two or three times a day; or the two drugs may be given in combination. Hydrastis is more apt to disturb the digestion than ergot, and must, therefore, be given with circumspection.

Stypticin, a micro-crystalline, yellow powder, soluble in water and having an intensely bitter taste, has given good results in some hands. H. J. Boldt (*Amer. Med.*, 1904, vol. 60, p. 93) treated thirty-five cases of fibromyomata with this drug, and obtained satisfactory results in thirty-one per cent of them. Boldt recommends doses of two and a half to five grains repeated at intervals of two or three hours. Three to five grains in a ten per cent solution, injected subcutaneously into the buttocks, produces a quick effect.

Thyroid extract, in doses of five grains, three or four times a day, has given good results in some cases of myoma. Great caution must be observed in the use of it, however, and should the heart action show the slightest evidence of disturbance, in rapidity of action, irregularity of the pulse, or cyanosis of the face or lips, it must be discontinued at once. It is best to begin with a dose of two grains and increase it gradually up to five grains.

Gelatin has proved useful in the control of hemorrhage from fibroids in some cases. A ten per cent sterile solution has been put upon the market by various manufacturers, and this may be used for hypodermic injections, diluted one half with hot sterile water, one hundred to five hundred cubic centimetres being injected into the buttocks. The injection of gelatin into the uterine cavity has been described on page 173. The gelatin is most useful in cases where the blood coagulates more slowly than usual (that is to say takes more than three to four minutes). Calcium lactate also is of value in this class of cases, given in doses of twenty grains, three or four times a day, for long periods of time.

Prolonged hot vaginal douches are of great benefit in controlling hemorrhage in many cases. If one is to be given, the patient should be in her night-dress, and should lie on her back with the buttocks raised higher than her shoulders by means of a douche pan placed under them. At least six quarts of water should be used at a temperature of 110° to 120° F.; the fountain syringe or douche pan is hung not more than three or four feet above the patient and the usual hard vaginal nozzle employed. After the douche, the patient should rest for at least two hours, and it may be repeated twice or even three times in twenty-four hours.

A large ice-bag placed on the abdomen sometimes proves useful in lessening hemorrhage.

In severe cases the patient should be kept absolutely at rest in bed; the diet limited to solid articles of food, and all stimulants, whether spices, hot or alcoholic beverages, prohibited.

Packing for Hemorrhage.—Many of the mechanical measures for checking hemorrhage have been described already (see Chap. VII, p. 172). One of the best of these is packing the vagina with wool or cotton tampons covered with vaselin. The patient should preferably be in the knee-breast posture, or that of Sims; a large quantity of vaselin and tampons of small size should be used, the vagina being packed as tightly as possible. If this treatment is not efficacious, the uterine cavity should be packed with aseptic gauze covered with vaselin. To do this the cervix must be dilated by means of Hanks dilators sufficiently to admit a Burrage uterine speculum; the end of a long piece of gauze, one inch wide, is carried well down to the fundus with a forked packer, and the cavity packed from the fundus down, after which the vagina is packed with vaselin tampons. The gauze must be all in one piece and the end should project from the external os. Some gynecologists soak the gauze in a ten per cent sterile solution of gelatin instead of vaselin, and get good results. E. C. Dudley ("Principles and Practice of Gynecology," 4th edition, p. 359) cites a remarkable case in which intra-uterine sterile gauze packing not only controlled hemorrhage, but resulted eventually in the almost total disappearance of a large fibroid tumor.

It is not proper to go on treating a woman suffering from hemorrhage month after month, and the lines of treatment suggested here are rather for adoption while waiting to carry the patient to a surgeon. A patient who needs packing for hemorrhage is clearly a surgical case.

Intra-uterine Treatment.—It must always be remembered that in the invasion of the uterine cavity the utmost caution is necessary, for even with the strictest aseptic precautions, sepsis has followed the simplest intra-uterine treatments. Kubinyi (*Centrbl. f. Gyn.*, 1904, vol. 28, p. 775) reports the case of a primiparæ, forty-two years old, who had a multiple fibroid filling the lower abdomen attended by menorrhagia; she had been treated by an intra-uterine injection of iodine on three successive days, and five days later she had high temperature, pain, chills, and a foul vaginal discharge. At the end of a week, as she still appeared septic, the abdomen was opened and supra-vaginal hysterectomy performed, when it was found that there was a necrotic area in the endometrium with thromboses of the vessels extending into the tumor.

Pincus ("Atmokausis und Zestokausis," Wiesbaden, 1903) points out the dangers attending treating the interior of the uterus in the case of myomata with live steam, although a strenuous advocate of it as a therapeutic measure in many other pathological conditions. In fibroid tumors the cauterization is so little under control that it may affect an area of unknown size in the uterine interior with necrosis, so that its use is not to be advised.

Curettage, which is so valuable in relieving uterine hemorrhage associated with disease of the endometrium, is of much more limited value in the treatment of myomata. Moreover, it is frequently followed by sloughing and resulting infection of the tumor. It may be definitely stated, therefore, that curettage, like other forms of intra-uterine treatment, should not be employed for myomata.

General Considerations.—The treatment of a pedunculate submucous nodule is exclusively surgical. It is not good treatment to administer ergot to a patient with a fibroid of submucous evolution in the expectation that the uterine contractions will cause extrusion of the tumor. If the tumor does not occasion excessive hemorrhage, the patient may be treated with iron and constitutional tonics until the tumor becomes pedunculate in the natural course of development. If the hemorrhage is excessive, and the methods already described are of no avail, the uterine cavity may be packed as already described. The stimulation has been known to cause the extrusion of the tumor from the uterine wall.

If the tumor is pedunculate, it should be removed under strict aseptic precautions. The growth should be seized with four-toothed volsella forceps and twisted until it comes away; if hemorrhage follows, it can usually be controlled by swabbing the interior of the uterus with pledgets of gauze soaked in equal parts of the tincture of iodine and pure carbolic acid, taking care first to protect the vagina with gauze. Should the bleeding be excessive, it must be controlled by irrigating the interior of the uterus with scalding water, and if this fails, by packing with dry gauze. When the pedicle can be seen or felt, it can be tied with catgut and cut off distally to the ties. It may be necessary to use the uterine scissors to separate the tumor or to trim out bits of tissue by the twisting process. If exploration of the uterine cavity with the finger (see p. 477) reveals the presence of several tumors and an extensive operation is indicated, the case should be referred to a gynecologist.

If the tumor is sapping the patient's strength by pain, or hemorrhage with its attendant anemia, a radical operation should be advised; and the same advice obtains if there are degenerative changes or if pregnancy is prevented. Due regard must be shown, of course, to the most favorable time for operation as regards symptoms, the possibility of future pregnancies, and the condition of the general health. It is not sufficient to make a diagnosis of fibroid tumor, decide upon operation, and appoint a day for it; no radical operation should be advised until the physician has become thoroughly familiar with all the circumstances of his patient's social condition, as well as with the facts concerning the tumor itself, and the symptoms it excites.

If operation is decided on, the patient must be put into the best possible condition for what may prove to be a severe tax on all the vital resources of the system. The percentage of hemoglobin and the number of the red blood corpuscles should be determined; the urine should be examined; the heart and lungs auscultated and percussed and any abnormalities noted; the skin must be put into good order by hot baths; anemia corrected by iron and arsenic; and heart tonics and diuretics ordered, if indicated. No radical operation should be performed if there is an advanced nephritis, or a persistent glycosuria. A pyelitis may be helped by taking the pressure off the ureter. In bleeders it is frequently necessary to check hemorrhage by artificial means during several menstrual periods, at the same time administering iron and ordering forced feeding until the patient is in proper còndition for operation. Some patients are in such an impoverished condition that it is of the utmost importance to save every drop of blood, and time spent in preparation for operation in such cases is well expended.

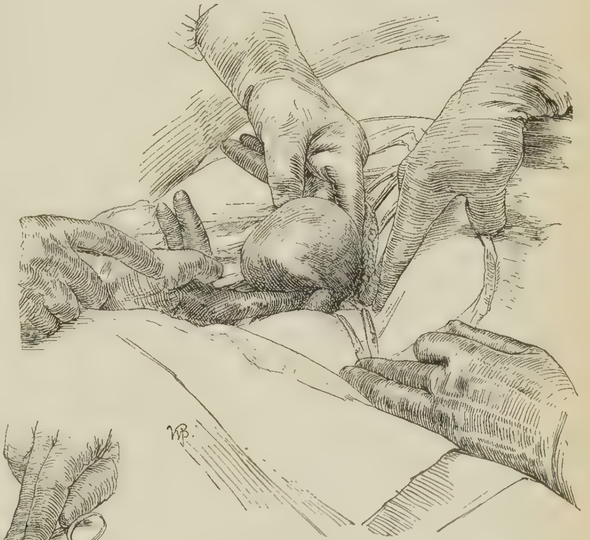

Fig. 130.—Showing a Globular Myomatous Uterus Delivered through an Abdominal Incision. The hands are employed merely in showing the tumor.

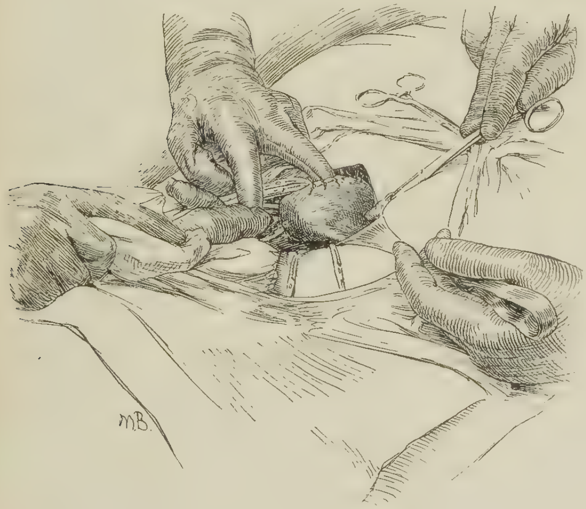

Fig. 131.—Shows the Same Uterus seen in Fig. 130 after Removal of the Myoma from its Posterior Wall.

The relative merits of a myomectomy or a hysterectomy can be determined only by the surgeon at the time of operation. It seems hardly worth while to consider the operations of ligature of the uterine arteries or oöphorectomy performed to cause atrophy of fibroid tumors, because the results of myomectomy and hysterectomy in competent hands are now so satisfactory, and if any operation is performed, it is better to remove the tumor altogether and thus obviate the risk of subsequent degeneration and other harmful effects (see Figs. 130 and 131). Myomectomy should always be preferred in a young woman, provided there are no complicating conditions, such as extreme anemia, in which case the prime indications are to check hemorrhage and avoid a protracted operation. Myomectomy is, however, a more dangerous operation than hystero-myomectomy (supravaginal operation). In three hundred and six cases of myomectomy in my practice there was a mortality of four and a half per cent in contrast to a mortality of three and one-tenth per cent in six hundred and ninety-one cases of hysterectomy. Noble (*loc. cit.*, pp. 711, 712) gives the mortality of myomectomy in the hands of trained gynecologists as from three to five per cent; of hysterectomy (supravaginal operation) as two to four per cent; and of total hysterectomy nearly double that of hystero-myomectomy. In badly complicated cases and in untrained hands the mortality of these operations is as high as ten, twenty, or even thirty per cent.

The most favorable time for a radical operation on a fibroid tumor is just before a menstrual period, because at this time the blood-making organs have had the best opportunity to make good the loss of blood, and, in the case of tumors causing dysmenorrhea, the patient has had a chance to rest from the depressing effect of the pain of the last period.

FIBROID TUMORS AND PREGNANCY.

When fibroid tumors are associated with pregnancy it may become a nice question whether to let the patient go to term, or to provoke an abortion, or to do a radical operation, removing the uterus, the tumors, and the ovum all in one mass. The first point of importance in such a contingency is, as a rule, to realize that a fibroid tumor is not a serious complication, and therefore it by no means calls for interference from the mere fact of its existence. Again, if the case is watched throughout the pregnancy as it should be, the danger of non-interference is but slight. When the fibroid growths are numerous, nature generally steps in herself to relieve the situation by causing a spontaneous abortion.

The cases which require interference are those in which a large tumor springs from the cervix and chokes the pelvis below the pregnancy, or else those in which a tumor springing from the posterior half of the uterus is immovably wedged in the pelvis. Often a case which looks grave at the outset rights itself as pregnancy advances by the ascent of the tumor and requires no interference.

Tumors in the upper part of the uterus do not often complicate pregnancy or labor. The real complication in large tumors begins after delivery, when there is a greater liability to hemorrhage. In all doubtful cases, perhaps in all cases without exception, a conservative specialist ought to be consulted.

CHAPTER XXI.

CANCER OF THE UTERUS. DIAGNOSIS AND PALLIATIVE TREATMENT.

(1) Etiology, p. 489.
(2) Diagnosis: Clinical history, p. 493. Local signs, p. 496. Microscopic examination, p. 501.
(3) Prophylaxis, p. 506.
(4) Treatment: Curettage, p. 510; cauterization, p. 512; X-ray, p. 513; radium, p. 513; methylene blue, p. 513; thyroid extract, p. 515; trypsin, p. 515; acetone, p. 515; general remedial measures, p. 517.

The uterus is by far the most frequent seat of primary cancer, and the disease in that situation is so prevalent that no busy general practitioner passes a year without the opportunity of observing one or more cases in his own practice. It is of the utmost importance, therefore, that the physician in general practice should be perfectly informed on all its diagnostic features, for the recognition of this frightful scourge in its early stages depends largely upon him. It is the general practitioner also who must bear the daily burden of treatment in cases where the disease is not discovered until it is too late to adopt radical measures of relief, as well as in those in which it recurs after a futile operation.

The ravages of the disease upon the contiguous pelvic organs are well shown in Figure 132, where a cancer beginning in the cervix has extended up into the body of the uterus; down onto the vagina forward into the bladder, forming a vesico-vaginal fistula; and backward into the rectum, which is extensively involved. If we could see the lateral extensions also, we should find both broad ligaments choked and the disease extending up to the pelvic walls.

ETIOLOGY.

The etiology of cancer is a subject upon which the general practitioner should be carefully posted, in order that he may, by his judicial advice, prevent injustice being done to an already overburdened and distressing class of sufferers. Evidence gathered from widely spread sources shows a growing impression among the laity that cancer is "a catching disease." This notion is fostered, on the one hand, by certain physicians who draw conclusions from a few data and express themselves in print upon a subject which they have not studied in all its bearings; and, on the other, by the attitude of the press throughout the country, as well as that of some pseudo-medical journals, which seem always ready to foster the idea that cancer is contagious. This phase of the subject has been carefully investigated by W. S. Bainbridge (*Bost.*

Med. and Surg. Jour., 1907, vol. 156, p. 835), and I give a brief abstract of the principal points in his paper:

"Bainbridge cites the familiar question, so often heard in the consulting room: 'Is cancer contagious?' and then refers to a case in which a nurse

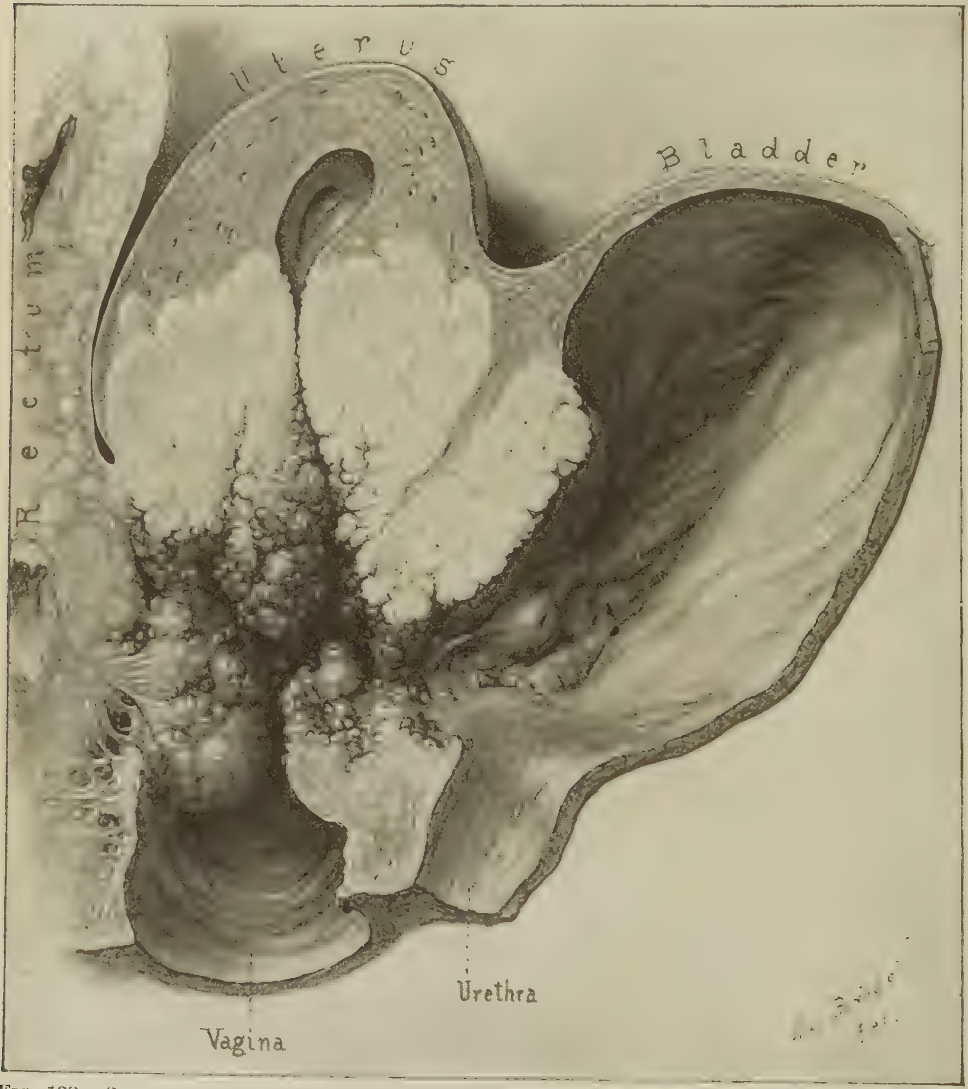

FIG. 132.—SQUAMOUS-CELLED CARCINOMA OF THE CERVIX WITH EXTENSION TO THE BLADDER AND RECTUM AND FORMATION OF A VESICO-VAGINAL FISTULA. (Natural size.) A sagittal section of the uterus, bladder, and rectum. The upper part of the vagina and the greater part of the body of the uterus are occupied by a new growth and the cervical landmarks are entirely obliterated. At the cervical site the growth has broken down; its upper margin is irregular but sharply defined, and stands out clearly from the uterine muscle, which is much darker in color. Along the lower or vaginal limit the growth is considerably elevated and overhangs the normal mucosa. At the point where the carcinoma has implicated the bladder it measures over 1 cm. in thickness and extends downwards to the inner urethral orifice. At the trigonum the bladder wall has broken down, with the formation of a vesico-vaginal fistula 1.5 cm. in diameter with ragged margins. The mouth of ureter, which is surrounded by a little mound of carcinomatous tissue, is seen a short distance within the inner urethral orifice. In such a case as this the bladder is not usually so large, as it commonly undergoes contraction after a fistula is formed from lack of the usual distention.

expressed her determination never to nurse another cancer patient, on account of the personal danger incurred by doing so. In another instance, a patient with cancer was practically evicted by fellow-boarders afraid of acquiring the disease. A still graver case is one in which the entire corps of nurses in a hospital in the County of Kings, New York, struck in a body, positively refusing to remain in the hospital if required to take care of a cancer case.

There can be no doubt that this notion of the contagiousness of cancer is in part fostered by the recent reversal of the attitude of the entire medical profession towards the tuberculosis question. Only a generation ago, it was positively held that tuberculosis was in no sense either contagious or infectious, while to-day a high degree of both contagiousness and infectiousness is recognized. The argument by analogy from tuberculosis to cancer is too strong to be resisted by the laity.

Three factors, says Bainbridge, play an important rôle in the etiology of cancer:

(1) Heredity.
(2) Congenital transmission.
(3) Infectiousness or contagiousness.

While there are some well-authenticated instances of the remarkable prevalence of malignant tumors in families within a few generations, nothing has been proven from these data beyond the fact that there may exist the same hereditary predisposition, found in many other forms of disease, such as infections, cerebral apoplexy, etc. An hereditary influence can be traced in from one-third to one-fourth of cases. Roger Williams, in 1892, reported one hundred and thirty-six cases of carcinoma of the breast, with a history of heredity in twenty-nine and two-tenths per cent; there were forty-eight cases in thirty-three families. He cites among others the well-known fact that the father, the brother, and two sisters of Napoleon all died of cancer of the stomach, to which he himself finally succumbed. Broca records sixteen deaths from cancer in a family of twenty-seven members. Chantemesse and Podwyssotsky declare that heredity in the case of a neoplasm is in reality but an inheritance of a predisposition to allow of the implantation of the parasite which they consider the true cause of the disease. Bainbridge urges that most of the arguments used to prove heredity can be employed with equal force to demonstrate a transmission by infection. Conclusive evidence on either side can be reached only after further investigations.

Cohnheim was the originator of the theory that in course of development certain cells were misplaced into tissues where they did not normally belong, and that it is from these misplaced cells that tumors take their origin. This interesting speculation, although widely discussed, has not, as yet, received positive confirmation.

Belief in contagion rests upon four things:

(1) The theory of the contagiousness or infectiousness of malignant tumors in mice.

(2) The transmissibility of the Jensen mouse tumor.

(3) Inoculation experiments.

(4) The reports of cases of coexistent or coincident cancer in families of human beings, supposed to be the result of accidental infection. In a disease so excessively common, the instances of coincident cancer occurring in people brought frequently into close contact with one another may readily be disposed of as mere accidental coincidences. As to the transmission of malignant tumors by means of experimental propagation, as Bashford has said, this demonstrates nothing more than that the cells of the tumor in one animal continue to proliferate in another animal, and this affords no proof touching the contagiousness or infectiousness of cancer in general. No facts have yet been adduced which prove that cancer can be conveyed by the ordinary contacts of human life.

In the present status of our knowledge, it is sufficient for the general practitioner to insist, on the one hand, that there is no danger of any member of the family catching the disease; and, on the other, to recommend that the same care and precaution should be taken as are proper during the treatment of any infected wound, for the protection of the healthy from contact and contamination. The cancerous wound should be kept as clean as possible by frequent cleansing; those who handle it should do so with protected hands, using forceps and other instruments as far as possible, while the cloths employed for dressings on the diseased surface must be burned immediately. Douching vessels must be kept for the patient's exclusive use and articles of clothing worn by her should not be put on by others. It is better for a patient with cancer to occupy her own bed and use her own separate bed-linen. Such reasonable care as this will satisfy the laity that everything possible is being done, and thereby secure their confidence when assured that the situation calls for nothing more. By doing this we shall avoid imposing unnecessary burdens upon sufferers who are already sufficiently pitiable, without the distress of complete seclusion and ostracism, not to say neglect.

In regard to the question of heredity I may say here that in forty out of forty-nine cases of squamous-celled cancer of the cervix treated at the Johns Hopkins Hospital, no history whatever could be obtained of malignant disease in the family; and in only two of the remaining nine was there any record of cancer in the uterus. In eighty-two per cent of these cases, therefore, hereditary influence could be excluded. In thirteen cases of adeno-carcinoma of the fundus there were only two where cancer had occurred among near relatives, and in neither of these was it situated in the uterus. These figures, it will be seen, are even less favorable to hereditary influence than those cited above.

Trauma.—There is a strong impression in lay circles that trauma plays an important part in the causation of all forms of malignant disease, which seems to be borne out in the case of cancer of the breast and of the uterus. There is no doubt that the injuries inflicted upon the cervix uteri during labor are a definite causal factor in subsequent cervical carcinoma. Ninety-eight per cent of the cases of squamous-celled carcinoma of the cervix in my clinic at the Johns Hopkins Hospital had had children, so that the proportion of cases in nulliparæ was extremely small. In my private practice I have seen, in all, but three cases of cervical cancer in nulliparæ, and in one of these the cervix had been forcibly dilated. Emmet mentions the occurrence of a cervical cancer in a woman who had never had children, and here also the cervix had been dilated. My associate, Dr. C. F. Burnam, however, has recently had a case in a nullipara where there had never been any operation on the cervix, and similar cases have been reported by W. H. Weir (*Amer. Jour. Obst.*, 1900, vol. 42, p. 377) and others. H. J. Boldt has been able to demonstrate the disease in its very incipiency in a laceration of the cervix. In advance of the local examination the fact that the patient is a nullipara is always strong presumptive proof against cancer of the cervix uteri.

DIAGNOSIS.

In making a diagnosis of uterine cancer three lines of investigation must be considered, namely, the clinical history; the local signs; and the microscopic examination. The local signs and the microscopic examination afford the most accurate information, but the clinical history is not without great significance.

CLINICAL HISTORY.

Age.—All statistics conspire to prove that cancer of the uterus is most frequent about the time of the menopause. R. R. Huggins suggests that the injuries sustained by the uterus during parturition render the cervix unusually susceptible to cancerous disease during the years when the degenerative changes accompanying the menopause are taking place. Before the cessation of menstruation the number of cases of cervical cancer is relatively larger than the cases of cancer of the fundus, whereas after menstruation has ceased, the opposite is true. Squamous-celled carcinoma may occur even in the twenties, but this is exceptional. Since the year 1900 I have seen several cases of cancer of the cervix at the Johns Hopkins Hospital in patients between twenty and thirty years old. Not many cases, however, begin either before forty or after sixty.

Menstrual History.—Menstruation is usually regular until the carcinoma begins to become active, and then, as a rule, it is profuse. In those patients who have passed the menopause before the carcinoma appears there is usually a history of normal regular menstruation up to the time of cessation. There does not appear to be any relation between menstruation and the occurrence of cancer.

Vaginal Discharge.—A discharge is present in all forms of cancer and it may be the first symptom of the disease. In cancer of the fundus it often appears before the hemorrhage. It is usually thin, watery, colorless, and irritating, and sometimes has a characteristic penetrating odor. Occasionally it is purulent and often it is blood stained. A bloody stinking ooze characterizes the last stages of a cervical growth.

Hemorrhage.—Loss of blood is perhaps the most important symptom of cancer and should not fail to receive immediate attention. Before the menopause it may occur with the menstrual periods, as an increase in amount or an extension of duration; or there may be more or less profuse hemorrhage during the intervals. In cervical cancer the bleeding is apt to come on suddenly after some unusual exertion, as lifting a heavy weight; after coitus; or with defecation. It is an earlier and more frequent symptom in cancer of the cervix than in cancer of the fundus.

Pain.—In the early stages of carcinoma patients rarely complain of much suffering; with further progress, however, there is a persistent, dull, heavy pain in the back or cramp-like pains in the uterus; as the disease advances and the growth presses upon adjacent organs and nerve trunks, the pain extends to the thighs, the knees, and even to the calves of the legs, following the course of the sciatic nerves. Cases are occasionally seen in which there is no pain throughout, but, as a rule, the suffering in the latter stages is a marked and peculiarly distressing feature.

Emaciation.—Loss of flesh is rarely well marked in the early stages of uterine cancer, indeed, the fact that the patient has lost flesh is good evidence that the disease has made progress; in some cases the body remains well nourished even to the end. The degree of emaciation depends upon the condition of the patient's appetite as well as upon the direct effect of the disease and the absorption of toxines upon the metabolism of the body.

Cachexia.—There is a peculiar lemon-colored appearance of the skin which is characteristic of malignant disease of all kinds and is most suggestive to the practised eye. It is due, according to Klemperer (*Charité Annalen*, vol. 16, p. 138), to the fact that more nitrogen leaves the body than is taken in. Like emaciation, it is a symptom of the later stages.

Any woman between thirty-five and sixty who comes to the physician complaining of increased menstruation, of metrorrhagia, of pelvic pain, or of vaginal discharge should be examined without loss of time on the suspicion of cancer. The old-fashioned practice of treating her tentatively for a time, in the hope that the symptoms will subside, cannot be too strongly condemned. If cancer of the cervix exists it can easily be recognized, even in its earliest stages. It is well to remember that an ulceration of the cervix at that age is practically always cancerous, bearing in mind that an "erosion" is not an ulceration. If there is no evidence of cancer of the cervix, and no definite cause for the symptoms can be found, the uterus should be curetted and the scrapings examined with the microscope. It is well to remember that it is sometimes necessary to examine many slides, and even to curette more than once before the evidence of cancer is secured. The earlier the stage and the more limited the disease, the more difficult it is to find.

G. E. Shoemaker (*N. Y. Med. Jour.*, 1905, vol. 83, p. 1092) mentions a case in which a woman of forty, who had had nine children, complained of constant uterine hemorrhage for three months. On examination the uterus was found enlarged, and curettage was therefore done to confirm or confute the suspicion of cancer. A grating sensation was noticed near the fundus, but on microscopic examination at first no cancer was found; then after a number of slides had been studied the evidence was forthcoming, and a hysterectomy was performed, when it proved that the only spot where the malignant disease existed was a little nodule, hardly larger than a grain of corn, in the upper third of the uterus.

A most potent cause of failure in the treatment of uterine cancer is neglect on the part of the patient to apply for advice until the disease is so far advanced that an operation offers no hope. It becomes a matter of vital importance, then, that the public should be well informed as to the symptoms which ought to excite suspicion, and which proclaim the necessity for immediate competent medical investigation.

D. H. Craig (*N. Y. Med. Jour.*, 1905, vol. 82, p. 65) investigated the histories of seventy-eight cases of uterine cancer and found that in forty-five of them the first symptom noticed by the patient was a leucorrhea; in twenty-two cases it was hemorrhage, varying in amount from the slightest stain to profuse bleeding; while in the remaining twelve cases, pain was experienced several weeks before any other indication appeared. The presence of any one of these three symptoms should never be overlooked in a woman over thirty-five. A certain difficulty, however, as Craig points out, arises from the fact that in the earliest stages of cancer the vaginal discharge has no special characteristics which may serve to distinguish it from the leucorrheas with which the majority of women suffer.

The education of the public mind on this question is peculiarly important on account of the prevailing impression that irregularities of menstruation and the existence of vaginal discharges are a feature of the normal menopause and must be accepted as a matter of course. Even metrorrhagia receives surprisingly little attention, because accounted for in the same way. In women who have passed the menopause there is a sort of reckless tendency to ascribe any hemorrhage from the vagina to a return of menstruation. But as Shoemaker observes (*loc. cit.*) "when a year or two has passed after a normally established menopause, the appearance of blood, if only a small spot, from the genitalia often means cancer. It need not be persistent; it need not be abundant; its very presence more than a year after the menopause is sufficient to arouse grave apprehensions of malignant disease."

The specialist occasionally sees a far advanced case of carcinoma, either of the fundus or the cervix, from which the patient has noticed symptoms only within three or four weeks. Such experiences generally occur with women who have nearly reached the menopause and make imperative the solemn command to every physician to investigate at the earliest opportunity any sign or symptom referable to the pelvic organs.

The instruction of the public at large as to these facts is the duty of the general practitioner and by its performance he has it within his power to save many lives. The only cure for cancer of the uterus is extirpation, and statistics show that when the case is in the surgeon's hands sufficiently early, the number of permanent cures is by no means small. Eighty per cent of the cancers of the fundus of the uterus at the Johns Hopkins Hospital were permanently cured; and, while the figures as to cancer of the cervix are not so encouraging, being fifteen to eighteen per cent cured, this percentage will be largely increased when the necessity for early operation is widely appreciated by the medical profession and the laity at large.

There can be no doubt that the most important agent in the instruction of the public is the general practitioner. Almost all women, and married women especially, have a more or less intimate acquaintance with some physician with whom they converse at one time or another on the subject of their own health or that of their relatives, and in whose opinion they place great confidence. If every family physician would make it a point to take advantage of the opportunities afforded him by such relations, to point out the significance of hemorrhage, vaginal discharge, and pelvic pain occurring about the time of the menopause, he would accomplish more towards diminishing the death rate of cancer than can be done by any other means we can command at present.

LOCAL SIGNS.

Two kinds of cancer are found in the uterus: (1) those which begin to grow in the cervix (see Fig. 133), and (2) those which start in the body of the uterus, at some point above the internal os uteri (see Fig. 134). The great practical difference between the two lies in their radically different clinical course, cancer of the body growing slowly, affecting the glands, and extending outwards only in the later stages, while cancer of the cervix affects the glands early, and spreads with the utmost rapidity into the neighboring tissues.

Cancer of the Cervix.—On making a vaginal examination in cancer of the cervix the conditions which the examiner finds vary greatly according to the stage of the disease, which may conveniently be divided into three classes: (1) of enlargement; (2) of breaking down; (3) of craterous excavation. These various locations and the course of a cervical cancer are shown in Figures 135, 136, 137, 138, 139, 140 and 141.

In the first stage the cervix is slightly enlarged, or one of the lips appears nodular, puffy, and has a slightly glazed appearance,

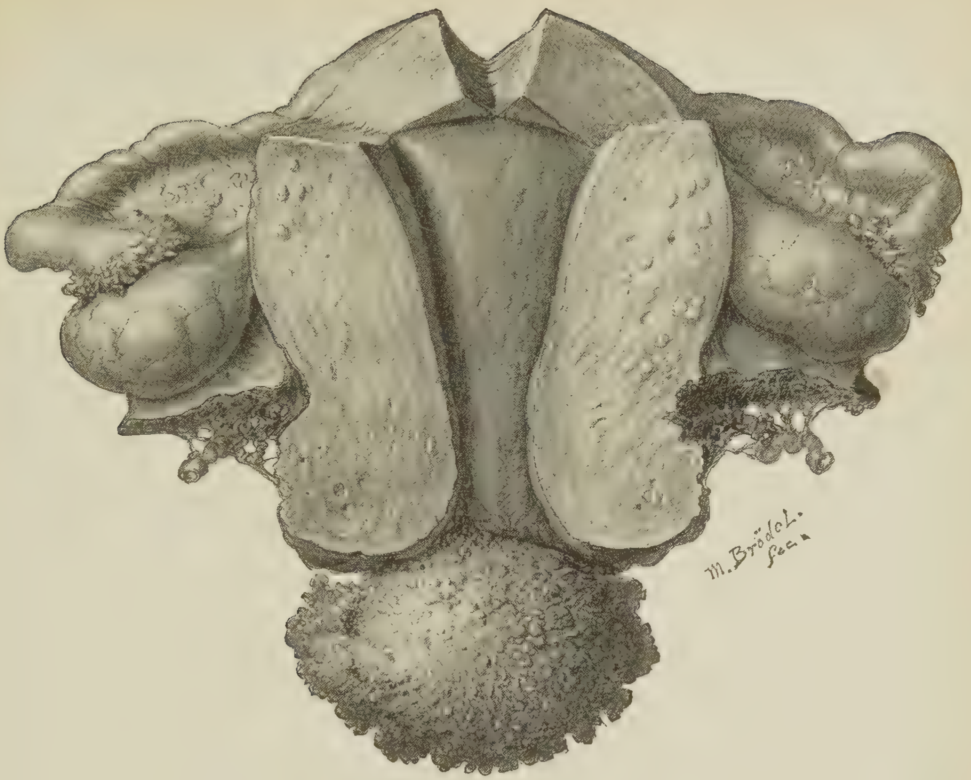

Fig. 133.—Squamous-celled Carcinoma of the Cervix; Carcinomatous Mass Springing from the Anterior Lip. ($\frac{4}{5}$ natural size.) Uterus opened and showing the posterior aspect. A cauliflower growth is seen on the cervix; the uterine tubes and the ovaries are uninvolved.

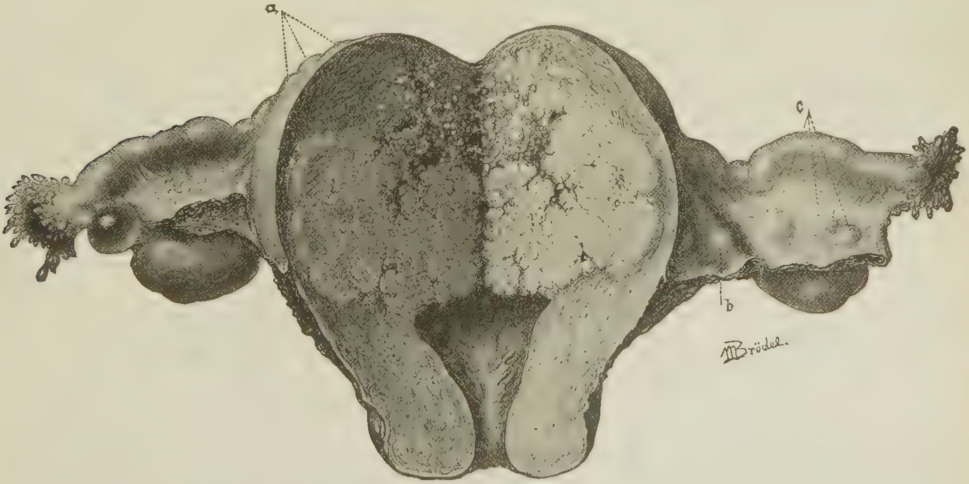

Fig. 134.—Adeno-carcinoma of the Body of the Uterus with Extension to the Left Round Ligament. ($\frac{5}{8}$ natural size.) The uterus was nearly twice its normal size. The cervix and the lower part of the body present the usual appearance, but the upper half of the body is occupied by a friable-looking growth which has involved the entire thickness of the uterine walls (*a*). In the left round ligament is a definite nodule (*b*), while between the left tube and ovary, and following the course of the lymph channels from the body of the uterus, are three small, oval, carcinomatous nodules (*c*). The appendages on both sides appear to be normal. (After W. W. Russell.)

with one or more enlarged vessels coursing over it, and perhaps a few teat-like processes projecting from its surface. The examining finger usually brings away a little blood, which is most significant. In some patients, seen early, this is all that can be found; or, possibly, there is already a small mulberry-like mass. In many instances, unfortunately, the vagina is already more or less filled with a cauliflower growth which is extremely friable, breaks down under the examining finger, and at times bleeds profusely. If this growth is traced to its attachment it will be found springing from one of the lips of the cervix. In the first stage of the disease this cervical involvement is all that can be found, the vaginal mucous membrane below the cervix appears normal, there is no thickening in either of the broad ligaments, and the uterus still remains freely movable, unless fixed by some associated inflammatory process.

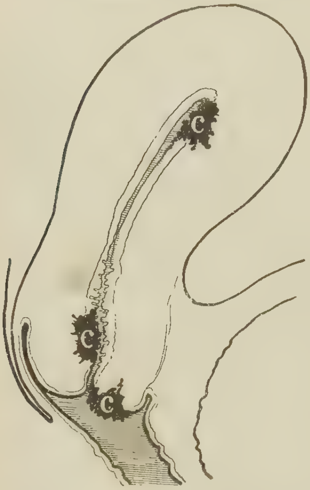

Fig. 135.—Illustrates the Three Principal Foci from which Carcinoma of the Uterus takes Its Origin.

In the second stage the growth has begun to break down and disappear. The margins of the cervical lips are swollen and livid and within the margin is a rough, uneven, scooped-out area readily detected by the finger. The induration often extends out onto the vaginal vault and down its walls, and by the time these changes have occurred, there is almost always

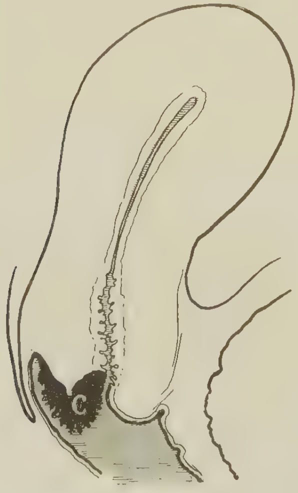

Fig. 136.—Early Stage of Squamous-celled Carcinoma of the Cervix — Everting Type.

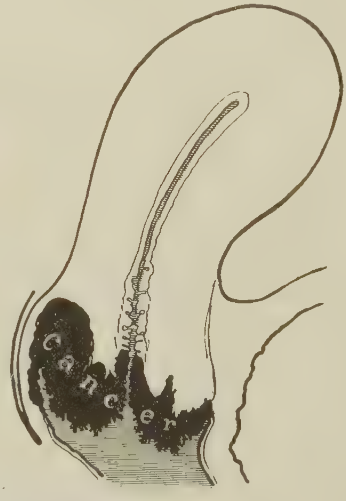

Fig. 137.—More Advanced Stage of the Disease seen in Fig. 136. The cancer has invaded both lips and extended to the posterior vaginal vault.

some decided coincident thickening of one or both broad ligaments. Examination with the speculum shows a ragged bloody excavation covered here and there with necrotic tissues. The advancing margin of growth is marked by a hard ridge covered with the vaginal mucosa. The body of the uterus, as a rule, remains unchanged in cervical cancer. Sometimes it is as large as a two or three months' pregnancy, reaches up as far as the pelvic brim, and has a tense elastic feel, owing to an accumulation of pus in the uterine cavity.

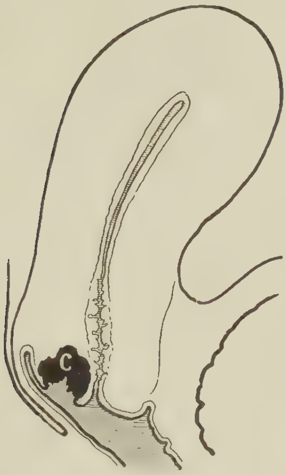

Fig. 138.—Early Stage of Squamous-celled Carcinoma of the Cervix. Infiltrating type.

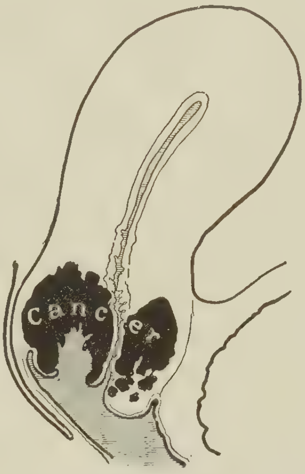

Fig. 139.—More Advanced Stage of Disease Seen in Fig. 138, showing the Breaking down in the Center and the Formation of a Crater.

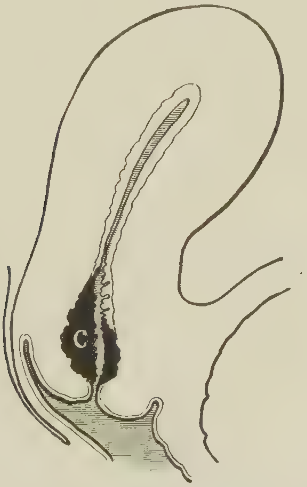

Fig. 140.—Early Stage of Columnar-celled Cancer of the Cervical Canal. The disease is not manifest to inspection of the cervix but to the touch of the cervix feels greatly thickened.

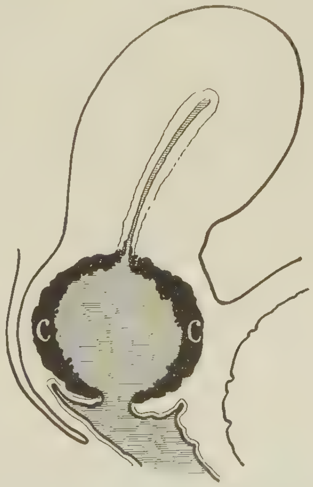

Fig. 141.—More Advanced Stage of Disease seen in Fig. 140. A crater-like cavity is formed. The progress of the growth of carcinoma of the cervix is shown in more detail in "Studies in Gynecology," by J. A. Sampson, 1907.

Again, at a later stage all trace of the cervix will have disappeared, and the vaginal vault is occupied by a hole surrounded by a puckered, hard, nodular tissue, while from the opening issues a foul brownish discharge. The mucosa of the surrounding vaginal vault is often intact, but the underlying tissue is indurated, owing to the extension of the growth, while isolated nodules are seen and felt lying just underneath the mucosa in any portion of the vagina. Sometimes the entire vaginal vault is enlarged and lined by a necrotic and friable carcinomatous tissue, while the surface of the vaginal mucosa is covered by little shaggy tufts of the cancerous growth. In more advanced stages all anatomical relations are lost; the entire upper part of the vagina is choked with the cancer, and the urine trickles down into the vagina through a vesico-vaginal fistula; the rectum may be involved and the feces pass also per vaginam (see Fig. 142).

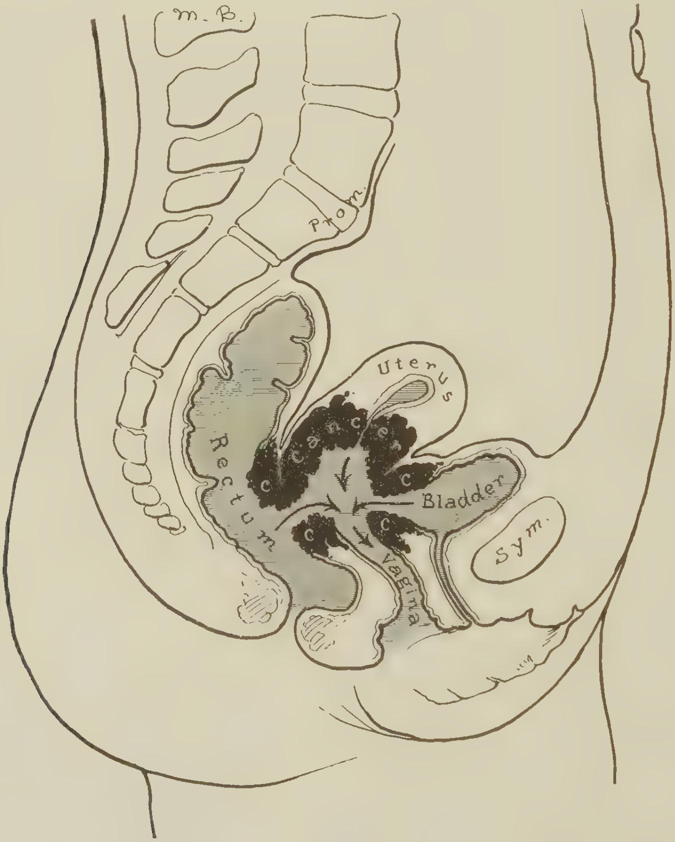

Fig. 142.—Diagram showing an Extremely Advanced Stage of Cervical Carcinoma, in which the Disease has Advanced to the Bladder and the Rectum.

I often see cases brought in consultation, it may be from a distance, in which the physician has mistaken a red everted cervix (so-called "erosion"); or a cervix covered with multiple, red, plaque-like, bleeding areas; or a hard nodular everted cervix containing multiple cysts (Nabothian follicles), for a cancer.

These cases can be distinguished from cancer by the following marks: In the everted mucosa, the longitudinal striæ can often be seen on the smooth glistening mucosa, and this shows no particular liability to bleed upon handling. The plaque-like areas, which are so prone to bleed, are in reality superficial erosions, but differ from cancer in being superficial and isolated or multiple. The Nabothian cysts are easily recognized by puncturing them with a sharp-pointed scarifier, when the mucilaginous contents escape and the cyst collapses; they may feel like shot and are isolated and covered with velvety mucosa. In general the cancer is hard and granular, breaking down under the finger, and bleeding readily.

Cancer of the Fundus.—In cancer of the fundus the body of the uterus may be enlarged to the size of a three months' pregnancy, while at other times it is nearly or quite the normal size. The diagnosis in the early stages of cancer of the fundus must depend almost entirely upon the history, and upon a microscopical examination of scrapings from the endometrium. It is, in fact, in this variety of cancer that curettage is of such importance. The diagnosis of cervical cancer is easily made from the visible and tangible local signs, while the disease is still in a sufficiently early stage for radical operation to offer prospect of a cure, but in cancer of the fundus the only means of accurate diagnosis in the early stages is the microscopical examination of scrapings from the mucosa. In the later stages the palpation of alternate hard and soft areas in the enlarged fundus helps to distinguish the disease from myoma. In rare instances, carcinoma of the fundus projects through the cervix as a rounded or pyriform mass and simulates a submucous fibroid. My associate, Dr. Guy L. Hunner, had such a case, in a woman of sixty-one years of age, who had had irregular bleeding for eleven years; and the true nature of the growth was not suspected until the patient was anesthetized, when the tumor was found to have a broad origin in the fundus, and bimanual examination demonstrated hard and soft areas throughout the uterine walls.

MICROSCOPIC EXAMINATION.

If cancer of the cervix is suspected, a wedge-shaped piece is removed for microscopic examination; when cancer of the fundus is in question, the cavity of the uterus is curetted and the scrapings examined by the microscope. When a piece of the cervix is to be removed, the cervix is drawn down by bullet forceps, and a wedge-shaped piece, about one centimetre broad at the base and one centimetre in length from base to apex, is excised with a sharp knife. The raw surface is then cauterized to stop hemorrhage or it is approximated by two or three silk or catgut sutures. As a rule this operation is not painful, but if any pain is felt a syringe full of a weak cocain solution (1:500) injected into the cervix will obtund sensation.

The operation of curettage of the fundus (see Fig. 143) has been already described in Chapter VII (see p. 175), but it is of great importance that it should be performed with extreme thoroughness, since it may happen, in an early stage of the disease, that the diseased tissue is the only portion left behind. The curettings must be caught by the spoon as they emerge from the external os, and placed at once in the hardening fluid (formalin, ten per cent). If the curettings should demonstrate a malignant disease, no time should be lost in sending the patient to a specialist for radical operation. There is an impression among some surgeons that curettage tends to hasten the extension of the disease, but in our gynecological work we cannot avoid it.

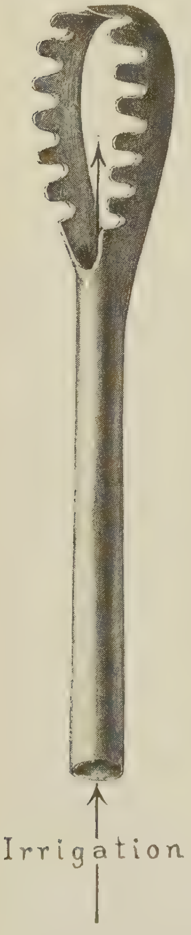

Fig. 143.—Large, Serrated, Toothed Curette, with Opening through the Handle by which Irrigation of the Uterus can be Carried Out at the Same Time as the Curetting

The tissues may be studied at once by the method described in Chapter VII (see p. 178); or they may be placed in a hardening medium and studied at leisure. In cases where the services of an experienced pathologist cannot be secured and the physician's knowledge of pathology is not sufficient for so important a task, the specimens can be sent in the hardening medium to one of the large hospitals and an opinion obtained from the pathologist connected with it. It is practically impossible by description, even with the best illustrations, to equip the average practitioner with the ability for making a certain microscopical diagnosis of cancer of the uterus. It is true that with the courses in histology and pathology now offered in most of our post-graduate medical schools, the graduate should be able to easily identify the characteristic microscopic section of cancer of the uterus; but not all microscopic sections, even in pronounced carcinoma, are characteristic, and there are many conditions of the cervix and endometrium, such as hypertrophies, inflammations, polypoid growths, hypertrophy of the glands, etc., which yield microscopic sections so suggestive of carcinoma that none but the experienced pathologist should be trusted with the final opinion. Special warning is in order at this time because of the many pathological laboratories now being conducted, often by drug firms, on a purely commercial basis. No physician should trust the report of a laboratory without knowing positively that the pathologist making the report has had special training in the examination of uterine scrapings.

In making an examination it is always well for the examiner to refresh his memory as to the normal appearance of the tissues to be examined and also to follow some systematic method of examination.

When the piece excised from the cervix is examined, the vaginal portion is looked at first, in order to ascertain whether the squamous epithelium shows the proper number of layers, if its cells present the usual appearance, and if there is any tendency to invasion of the underlying tissues. Also, if there is any small round-celled or polymorpho-nuclear infiltration between the individual cells. An increased richness in the blood supply is also to be noted. In examining the cervical portion of the specimen the exact point where the squamous epithelium ends and the cylindrical begins must be observed, any irregularity of the surface occasioned by the mucosa being gathered up into small polypi should be observed; the shape of the polypi, if present; the character of their lining, whether one layer of epithelium or more; the uniformity or irregularity of the individual cells, and their tendency to invade surrounding tissue; and, finally, the condition of the stroma.

When we find a small round-celled infiltration of the stroma between the individual cells, increased richness in the blood supply, a tendency on the part of the epithelium to gather up into finger-like projections, or in the cervical portion any change in the shape of the glands, and any proliferation of their epithelial lining, there is good reason to suspect a carcinoma and the specimen should be further carefully studied for evidences of new gland formation and invasion of the underlying tissues.

In examining the uterine mucosa from the body of the uterus, it must be remembered that under normal conditions a teaspoonful of scrapings is all that can be obtained, and the presence of more should arouse suspicion. Normally, the mucosa comes off in long ribbons about two or three millimetres broad and one to one and a half millimetres thick, but where malignant disease is present, the scrapings are usually large, irregular, or cuboid masses about one centimetre in diameter. The tissue is friable, and on careful teasing it is often possible to make out a thread-like branching appearance on the surface. Masses of tissue are also found in retained secundines, polypoid and ulcerative endometritis, and necrotic myomata.

Histologically, the character of the mucosa must be studied in order to observe whether it is smooth or gathered up into polypi, or papillary or tree-like growths, etc. Its relative thickness and the character of the surface epithelium must be noted; also the shape of the glands on cross-section, as to whether they are round, convoluted, or branching; whether they are uniformly distributed or lie closely together; whether the gland epithelium forms one or several layers; and whether the individual cells present a normal appearance. The glands, if there are any, must be noted. In examining the stroma the points to be considered are: whether it is dense or rarefied; the character of the stroma cells; the presence of any small round-celled or polymorpho-nuclear infiltration; the character of the blood vessels.

If the surface of the mucosa is gathered into folds or papillae; if the surface epithelium has proliferated so as to be more than one layer in thickness; if the individual epithelial cells are swollen; if they contain an increased amount of chromatin; if the glands are increased in number; if they are markedly convoluted and bunched together; if they are much branched; if they are irregularly distributed throughout the stroma; if the gland cavity is partly or completely filled with epithelial cells; if the stroma is of increased density; if the stroma cells are swollen; if there is much small round-celled or polymorpho-nuclear infiltration of the stroma; and if the blood supply is much increased, a diagnosis of cancer of the fundus may be made (see Figs. 144 and 145).

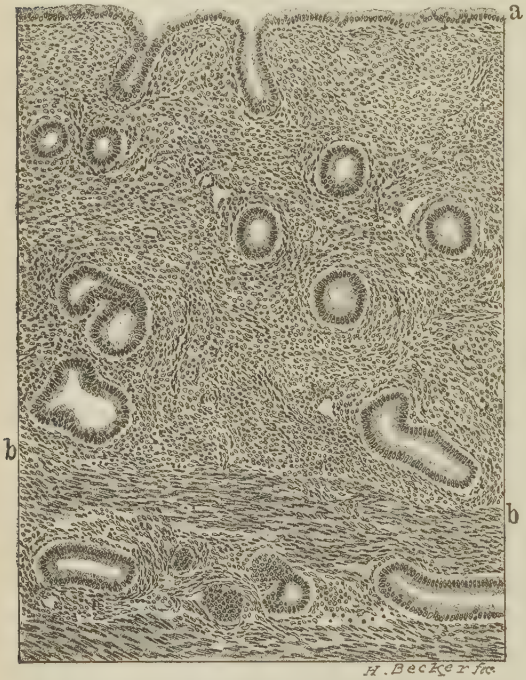

Fig. 144.—Normal Endometrium from a Patient Thirty-three Years of Age. (80 diameters.) J. H. H. Gyn.-Path. No. 704. The surface is even, the epithelial covering well preserved. Two glands are visible opening on the surface. In the superficial portion the glands are few in number and are round on cross-section, but in the neighborhood of the muscle they are cut obliquely and are slightly dilated. The gland epithelium is everywhere intact. The stroma is uniform in density and consists of cells with oval vesicular nuclei. Most of the spindle-shaped nuclei seen in the stroma belong to the endothelium of the capillaries. *b* indicates the line of junction between the mucosa and the muscle. Sections of several glands are visible in the muscle, their epithelium being unaltered and the glands themselves surrounded by the stroma of the mucosa. (From T. S. Cullen, "Cancer of the Uterus.")

An emphatic word of caution must here be entered against careless manipulation of scrapings removed for microscopic examination. The specimens must be clearly labelled as soon as removed with date, name, operation, destination, and when the examination is made no other specimens should be left lying about open upon the same table. If the slightest doubt exists in regard to the identity of a specimen it is better to throw it away, even though it is necessary to curette again to correct the error.

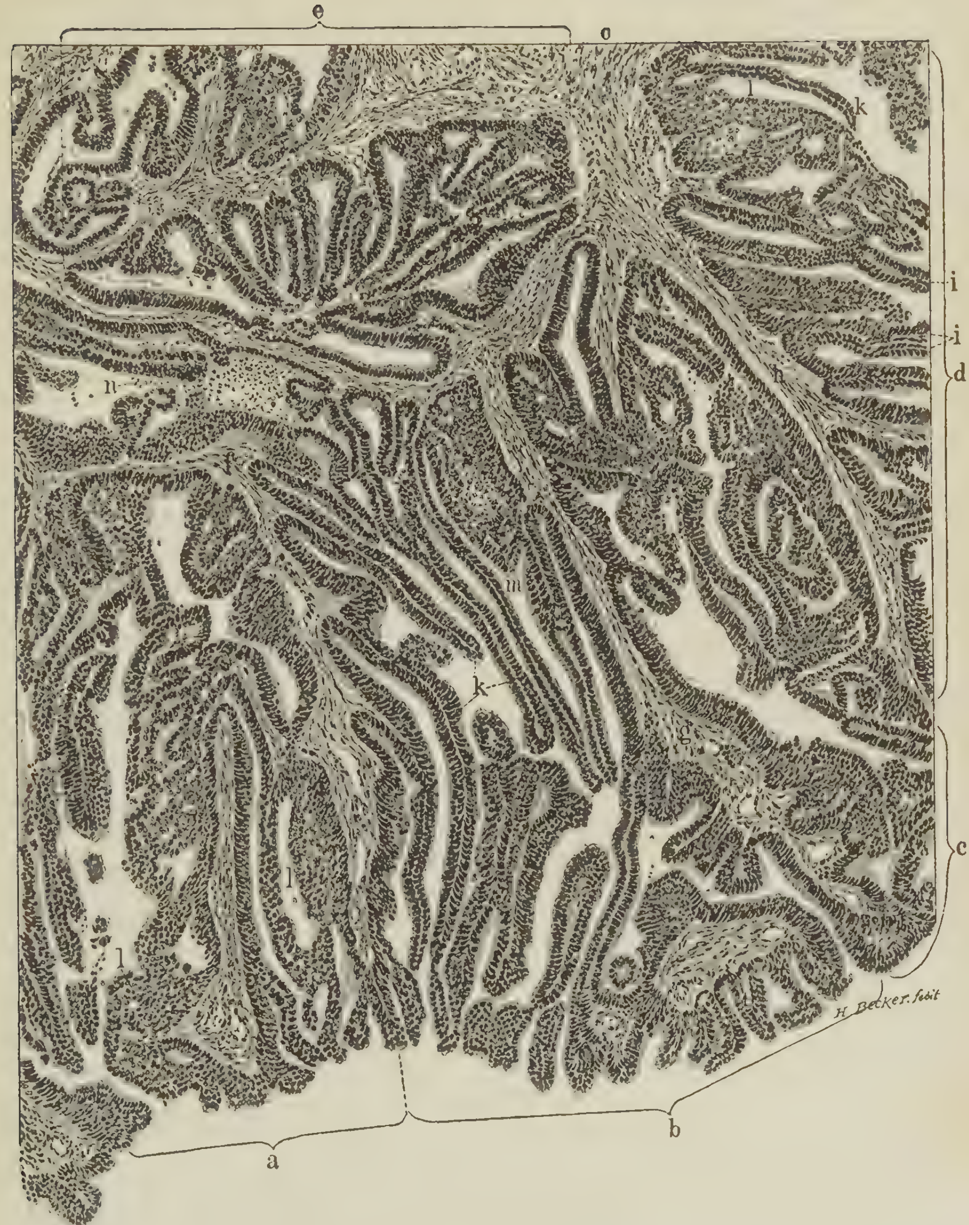

FIG. 145.—ADENO-CARCINOMA OF THE BODY OF THE UTERUS. (130 diameters.) J. H. H. Gyn-Path. No. 324. *o*, May be compared to a main stem, from which arise many secondary stems, which, in turn, give off delicate terminals consisting entirely of epithelial cells. In order to appreciate the tree-like arrangement the drawing should be turned upside down. The glands may be arbitrarily divided into groups, *a*, *b*, *c*, *d*, and *e*, by the stems of stroma *f*, *g*, and *h*. The stems are covered by several layers of cylindrical epithelium, while projecting into the gland cavities are long slender ingrowths of epithelium devoid of stroma as seen at *i*. Very delicate ingrowths consisting merely of two layers of epithelium are visible at *k* and *k*. At points indicated by *l*, the epithelium is several layers in thickness. At *m* there is also considerable thickening and polymorphonuclear leucocytes are visible, which have wandered out between the epithelial cells. At *n* numerous polymorphonuclear leucocytes are seen in the gland cavities. From the tree-like arrangement and the peculiar gland-like grouping, adeno-carcinoma may be readily diagnosed. (From T. S. Cullen, "Cancer of the Uterus.")

PROPHYLAXIS.

The cancer question from a therapeutic standpoint has a threefold aspect: (1) the discovery of the cause; (2) the effort to reach the cancer sufferers at an earlier stage of the disease while it is still curable; (3) the working out of a more radical operation. The latter condition has been so well met by the labors of J. G. Clark, Sampson, Riis, Wertheim, and others, that it seems impossible to take a single step farther in that direction.

The working out of the cause of cancer is to-day a question of laboratory investigation, and no notable progress is as yet observable, in spite of countless investigations by an army of skilled workers, and in spite of repeated announcements proclaiming the great discovery; it still lies in the womb of the future, undemonstrated, and utterly unknown.

The only avenue open with certainty to progress to-day lies in the direction of discovering our cases of cancer at an earlier stage in the disease, and this strategic point lies, as I have said, almost wholly in the hands of the general practitioners of our land. I would like to make this fact, and the consequences which flow from it, the point of greatest importance which I wish especially to emphasize in this chapter.

Can we, by a determined attack upon this point, effect any appreciable change in the present deplorable state of affairs within a reasonable period of time, say five or ten years? This question is best answered by considering what has already been accomplished on these lines in Germany.

G. Winter of Königsburg in the year 1902 undertook to improve the mortality statistics of cancer of the uterus in the only way open to him at that time and in the only way by which it is as yet possible for the surgeon to bring about an immediate improvement in his ultimate results, namely, by a series of letters addressed to physicians; by a series of articles published in the medical journals; and by articles appealing directly to the laity and appearing even in the leading daily papers. In these communications he instructed the medical profession at large as well as the laity, as to the earliest signs of cancer, and as well as the supreme importance of seeking immediate relief by surgical measures when these signs were noted. One of these personal appeals to his medical brethren was a brochure entitled "The Warfare against Uterine Cancer, a Word to All Operators for Cancer," Stuttgart, 1904. In the *Centralblatt für Gynäkologie*, 1904, vol. 28, p. 441, he gives a résumé of the results of this interesting propaganda, where he insists upon the following important facts with which every physician ought now to be familiar: (1) Any immediate improvement in the final results of operations for cancer must depend upon the performance of the operation at the earliest possible moment. (2) It is possible to secure patients for operation regularly within four weeks after the appearance of the first suspicious symptom and it is well worth the effort. (3) The chief difficulties in the way of the operator, and the cause of so many cases applying for relief too late, lie in the fact that (*a*) the lay public is grossly ignorant of the possible significance of the early symptoms of cancer, and is, therefore, inclined to ignore them until too late, and (*b*) the physicians who first see the patients fail to examine them promptly, and at the first visit, as they ought to do. A few, to their discredit be it said, actually seeing an early cancer, persist in treating it as an ulcer, until the favorable period has passed and the disease has advanced too far for radical treatment. In Germany a most important step has been taken in seeing that midwives are better informed. The convincing statistical results of Winter's interesting propaganda are as follows:

Out of eighty-four women who applied to a physician after the issuance of the instructions, only five were not immediately examined—eleven per cent. This contrasts favorably with fourteen and two-tenths per cent before the letters of instructions to physicians.

In the second place, in response to his invitation, many physicians made use of the facilities of Winter's laboratory, to secure a microscopic examination of tissues in suspected cases. Out of this largely increased number of specimens sent for an examination and an opinion, a number of cancer cases were found. As Winter remarks, it is evident from this that the seed sown fell on fruitful ground in the consciences of the physicians addressed.

Touching the midwives, eight cases of carcinoma first applied to them, and only one entirely neglected her duty in the matter. The result of the appeal to the midwives through the instructions was almost perfect. As to the lay public, the most important reasons for neglecting the early symptoms of cancer are ascribed to indolence, ignorance, false modesty, fear, poverty, and lack of time. The appeal to the public was made through a leading daily paper, in an article entitled "The Dangers of Cancer in the Lower Part of the Abdomen, a Word of Warning to Women," by Prof. Dr. Winter, of Königsburg. In this article, giving explicit details, he shows the public that most cancer cases are curable, if only they are taken in time, because the disease begins as a purely local affection. He further makes it clear that an operation is the only possible way by which the disease can be cured, and that the responsibility for so many failures lies with the patient who comes too late to be helped, a delay due largely to her ignorance of the early symptoms of the disease.

That cancer is frightfully common he proves by a reference to the statistics of East Prussia for the year. He also urges that it is important to go to the right place to secure relief immediately upon the appearance of any suspicious symptom.

The most important symptom he states is an irregular discharge of blood, particularly among women of a more advanced age, and especially in those who have passed the menopause. He calls special attention to the fact that cancer in its early stages does not cause pain and therefore its absence has no significance.

As a result of these instructions he found:

	1898–1902.	1903.
	234 women.	55 women.
Within the first month	33 or 14 per cent.	12 or 22 per cent.
Waited longer than 1 month	43 or 18 "	19 or 35 "
Waited longer than ¼ year	61 or 26 "	18 or 33 "
Waited longer than ½ year	28 or 12 "	3 or 5 "
Waited longer than ¾ year	42 or 18 "	3 or 5 "
Waited longer than 1 year	27 or 12 "	0 or 0 "

The dwindling percentages in the right-hand column show the effect of the letter of instruction upon the profession as well as upon the public. Ninety per cent of the patients, after the instructions had been issued, applied for operation within two weeks after first seeking the advice of a physician. The operability of the cases applying to him increased from sixty-two per cent before the instructions to seventy-four per cent afterwards.

It is sufficiently evident from these facts that a warfare against uterine cancer, carried on in the ranks of the general profession and also among the laity, may yield extraordinary results, even within so short a time as one year.

It is evident also, I think, that if we, too, here in America would make any immediate material progress in dealing with the cancer problem in this country, we must bravely follow Winter's initiative, however distasteful such a course of publicity may be, and however much it may be opposed to the time-honored precedents (shall I say prejudices?) of the medical profession.

I further urge two things which I have dwelt upon before, namely:

(1) In from six to eight weeks after every confinement the medical attendant should see his patient, with the object of making a careful inspection and of noting in his case-book the extent of the traumatism caused by the labor and just what lesions remain.

(2) Every woman who has borne children should be examined by a competent physician at least once every year until she is fifty-five years old. The effect of an adoption of these rules would be prompt discovery of an enormous number of cancer cases in their very incipiency. That such a course would be distasteful to women at large, I do not doubt, but drastic measures are often necessary to purge ill humors, and who would measure such a trifling sacrifice against the great gain of even a small increase in the percentage operability of this distressing and to-day largely hopeless class of cases?

TREATMENT.

The proper treatment for cancer whenever it is possible to carry it out with any reasonable hope of permanent success is by extirpation, and it is the only one which affords any prospect of a cure. Every case is operable in which it is possible to move the uterus freely. If the uterus can be pushed readily upwards by a finger resting on the cervix, it has lost little or none of its natural mobility, and in cervical cancer this fact tends to show that the disease has not extended beyond the confines of the cervix. Every such case should be placed in the hands of a surgeon who has had considerable experience in doing hysterectomy for cancer within a week after the physician has been consulted; moreover, the surgeon should be one who takes a hopeful view of the ultimate outcome in early cases.

The hopeless cases are those in which the uterus is fixed, as if anchored, by an exudate extending from the cervix uteri out to the pelvic wall on one or both sides. Even in such cases, however, it is well to consult a specialist. Let the physician note well that the cancerous uterus may also be fixed in several ways which may serve to confuse his diagnosis when he tries to determine the operability of a given case. Coincident pelvic inflammatory disease may so fix the uterus that it seems locked fast and immovable. A big pyometra may also fix it. Yet neither of these conditions does more than slightly complicate an operation which may be otherwise easy. If the cervix is stuffed and the vaginal vault choked with a cauliflower cancerous mass, this may interfere with mobility, but when the mass is curetted away, the uterus becomes quite movable. Again, I repeat, it is best in all cases, even apparently hopeless ones, to see the case with a specialist in order to give the patient the benefit of his judgment before she starts down that long sad road of suffering, humiliation, and ostracism to the gateway over which is written *nonquam revertitur.*

If the cancerous uterus can be removed, even though the ultimate success of the operation in effecting a permanent cure is doubtful, it ought to be done, for two reasons: In the first place, if the disease returns, it is often in a less distressing form, characterized by the absence of foul discharges and hemorrhages, and that, in itself, is a great gain. In the second place, a case which seems hopeless at the time of extirpation may run for years without a recurrence. I know of several instances in which I was ready to give a hopeless prognosis at the time of the operation, where the patient has remained well for a number of years; in one it was my confident expectation that the disease would return almost at once, and yet at an autopsy made ten years later no cancer was discoverable.

In the present state of our knowledge upon the subject there are many cases which do not come into the physician's hands until it is too late for operative measures, while there are others in which operation is only temporarily successful, the disease returning after a longer or shorter time. In both these cases the question of palliative treatment becomes of great importance, in order that the distressing symptoms associated with the disease may receive as much alleviation as possible. Lessening of the foul discharge and relief of pain, besides buoying up the sufferer's spirits in the thought that something is being done for her relief, are of immense benefit in making life bearable to her in the last stages of so dreadful a malady. Because cancer in an advanced stage is an incurable disease, there is no reason why the physician should fold his hands and say that nothing can be done. It is just as much his duty to relieve suffering as to effect a cure. The various means of relief at his disposal are here discussed *seriatim.*

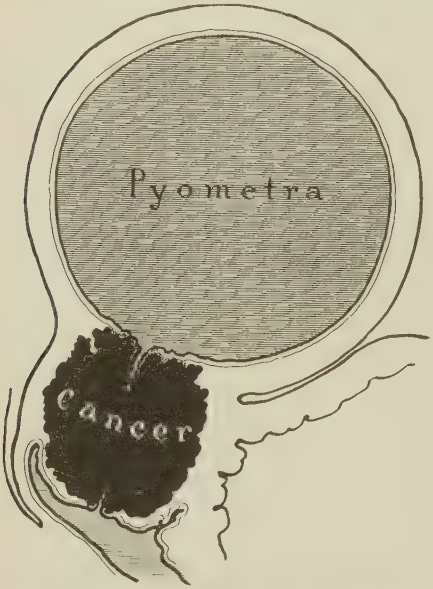

Fig. 146.—Advanced Stage of Cervical Cancer Completely Occluding the Cervical Canal with formation of Pyometra.

Curettage.—Even far-advanced cases where there is marked cachexia, a foul discharge, nausea, and progressive emaciation, are often much benefited by curettage, by means of which the masses of diseased tissue are removed and a clean cone-shaped excavation remains behind. The severe pain, so often present in advanced cases, is frequently due to the cervix being choked with retained discharges resulting in the formation of a pyometra (see Fig. 146), and the evacuation of this fluid will be followed by complete relief if the cervix is kept open. It is remarkable how much improvement will follow such a thorough curettage or the evacuation of a pyometra. The pa-

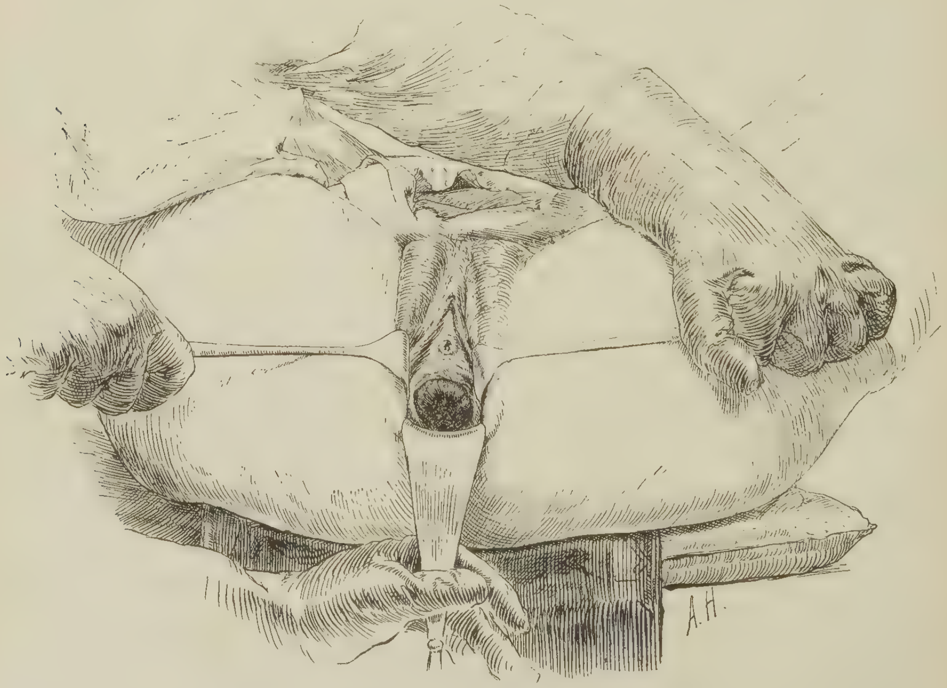

Fig. 147.—Showing Patient in the Perineal Posture on a Kelly Pad with Posterior and Lateral Retractors in Place. The cancerous cervix is by this means brought into view and is ready for curettage.

tient's color returns, her appetite improves, she ceases for a time to lose flesh, and is able to enjoy life while the improvement lasts. The curettage may be repeated four or five times during the course of the disease.

The parts are exposed as shown in Figure 147, after which the friable and most redundant portions of the diseased tissue are best removed by the aid of the index and middle fingers, and it is astonishing how much tissue can be taken off in this way. The sharp, serrated spoon curette (see Fig. 148, or the loop curette, Fig. 149) is then used, being held firmly and moved rapidly and boldly as it breaks down the diseased tissues under the guidance of the index finger, which locates the points to be curetted and also prevents the instrument from advancing too far in the direction of the bladder, the rectum, or the peritoneal cavity. The limit of diseased tissue which can be removed in this way is recognized by the scraping sound and sensation, indicating that a firm hard base has been reached. Less blood is lost by working rapidly down to healthier tissue than by a slower procedure which allows the rigid, diseased vessels to bleed; but when the disease has extended so far that the operator does not feel sure whether the next effort will not invade the bladder, rectum, or peritoneum, it is important to advance more slowly, controlling the curettage by repeated examinations. A finger in the rectum or a sound in the bladder will assist in determining the thickness of the septa.

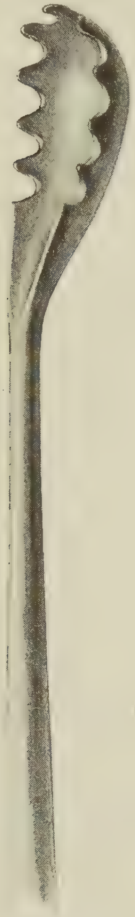

Fig. 148.—Spoon-shaped Curette for Use in Removing Tissue from the Cancerous Cervix.

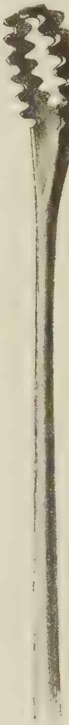

Fig. 149.—Open Loop Curette, which is Convenient in Some Cases.

If the peritoneal cavity should accidentally be opened, an iodoform gauze tampon must at once be packed closely within the rent and the operation continued until all septic and sloughing masses have been removed, down to a clean wound surface. The vagina is cleansed, the gauze removed, and a fresh pack inserted, which enters a short distance into the pelvic cavity. This is allowed to remain in place for three or four days, when it is removed and a fresh one inserted. The excavated area and the vagina must be loosely filled with an iodoform gauze pack and protected by vulvar occlusive dressing.

Cauterization.—When the bleeding following curettage is very profuse, it is sometimes necessary to cauterize in order to control it; and there are many cases in which cauterization is desirable for its own sake, either with or without curettage. W. B. Chase has given a good description of the method of using the actual cautery, which I quote (*Amer. Jour. Obst.*, 1904, vol. 49, p. 83: "Where large areas of ulceration are attacked and the tissues are friable, the curette may be first used to advantage. This is likely to result in pretty active hemorrhage. The hemorrhage may be controlled by the application of pledgets of cotton applied with pressure, first dipped in dilute acetic acid, usually of half strength, or by the use of the adrenalin chloride. After this the cautery knife is applied at a dull red heat until the surfaces are thoroughly charred. The after dressing consists of five per cent iodoform gauze, reapplied daily after the parts have been cleaned with peroxide of hydrogen. In all manipulations of the cervix the greatest gentleness should be used. The use of bivalve specula should be avoided, as they are likely to impinge upon the cervix and occasion hemorrhage. Dressing is best done with the patient in the Sims' position, and the parts exposed by means of a Sims' speculum. The only exception is when the posterior vaginal wall is involved. The slough separates usually in from one to two weeks. Daily dressing must be faithfully applied every day until healing follows, or, if it should not ensue, the dressings must be continued in order to keep the parts as aseptic as possible."

When healing is imperfect and unhealthy granulations reappear, they may be touched with carbolic acid or nitrate of silver, pure or diluted as the case may indicate. After the first day or two the parts should be douched, when the gauze is removed by a solution of lysol (one drachm to a quart of normal salt solution), or the same amount of a fifteen-volume formalin, one drachm to a quart, or a weak solution of tincture of iodine.

A certain skill is required in the use of the thermo-cautery. The cautery knife must be of just the right temperature; that is to say, hot enough to burn the structures and not hot enough to disintegrate them too rapidly, which causes trouble and hemorrhage. Great care must be taken to avoid going beyond the area involved and injuring the bladder, the ureters, the rectum, or the intestine. No pain is experienced, as a rule, from the use of the actual cautery, provided the cutaneous surfaces are untouched; on the contrary, nothing so effectually relieves the pain caused by the disease as the actual cautery. The vaginal surfaces may be protected from injurious heat by using strips of asbestos paper of proper size and shape.

The choice between a portable galvano and a Paquelin cautery is largely a matter of circumstances and convenience. The liability of most galvano-cautery batteries to get out of order is an objection, and it is never safe to begin a thermo-cautery operation without a second apparatus, either galvanic or Paquelin, in reserve. In some cases the cauterization may have to be repeated at intervals of two, three, or six months.

X-Ray.—H. K. Pancoast, official skiagrapher of the University of Pennsylvania Hospital, expresses the following opinion as to the results of X-ray treatment of uterine cancer (Kelly-Noble, "Gynecological and Abdominal Surgery," 1907, vol. 1, p. 321): "The X-ray may prolong the life of the patient. This is a fact worthy of recognition in many instances. The relief of pain has been observed by reliable authorities, and so frequently, too, that it must be recognized as a commendable result due directly to the treatment, and not to psychic effect. Pain is relieved in a large percentage of cases. This probably results largely from the direct anodyne effects of the rays. When the pain is due to presence of a mass upon the large nerve trunks, little relief can be expected. A lessening of the discharge and a decrease or a cessation of hemorrhage are frequently among the favorable results, and are often brought about early." It seems, therefore, that when it is possible to bring the patient under the care of a reliable radiographer and the expense of the treatment is within her means, it is worth while to test its efficacy in any given case. Unless a really reliable X-ray operator is at hand, however, it had better not be attempted, as the careless or unskilful use of the method has produced the most disastrous results.

Radium.—The benefit to be derived from the use of the radium salts in the treatment of uterine carcinoma has been the subject of discussion ever since it was first introduced in 1903. Whatever may be its efficiency in the treatment of cancer of the skin, there seems no doubt that it has never yet been of service in the treatment of cancer of the uterus. It will be worth a careful trial when we can secure a larger supply at reasonable rates.

Methylene Blue.—The treatment of cancer by methylene blue was first introduced in 1891 by Professor Mosetig-Moorhof, who read a paper before the Vienna Society of Physicians; and almost at the same time one appeared by two Italians, Cucca and Ungaro (*Rassegna d'ost, e gin*, 1891, vol. 26, p. 598). The first person to advocate the use of the method in this country was Willy Meyer (*N. Y. Med. Jour.*, April 11, 1891), and its application to uterine cancer, either of the body or the cervix, has been especially investigated by H. J. Boldt (*Merck's Bull.*, Jan., 1893).

The cancerous tissue is first thoroughly curetted with the sharp curette and the bleeding surface tamponed with dry iodoform gauze. Twenty-four to forty-eight hours later the gauze is removed, and after proper disinfection of the field of operation the methylene blue is injected. The patient is placed in the Sims' position and the surface exposed to view by means of a Sims' speculum and a Hunter's depressor. The parts are thoroughly dried with aseptic absorbent cotton and the needle is introduced to the fundus uteri, the syringe having been filled with an aqueous solution of blue (pyoktanin), 1 : 100. The needle is inserted any distance from half a centimetre (one-fifth of an inch) up to its full length, according to circumstances. The depth to which it is introduced is governed by the thickness of the part where the injection is made. While pushing the needle still deeper, the fluid is gradually pressed out by the piston so that the deeper tissues are infiltrated by fresh staining fluid. One syringe full will answer for two or three punctures. The fluid is next injected into the parametria on both sides, then into the posterior vaginal wall, and lastly into the anterior infiltrated vaginal wall, sometimes making as many as fifteen punctures at one treatment. It is best to begin with the most distant point, because on withdrawal of the needle some of the fluid returns through the needle puncture and discolors the tissues adjoining, a thing which would interfere with the requisite amount of precision for succeeding injections did it occur more proximally. A large cotton tampon is introduced into the vagina in front of the cervix and some protection must be worn, for even with the greatest care the clothing is apt to become stained. On the second day after the injection, the patient removes the tampon by means of the string attached to it, and uses a douche of warm water, after which she returns to the doctor's office for another treatment. The injections are repeated every second day for some little time.

Methylene blue has been given by the mouth in cases where the employment of injections was difficult or impossible, and has been strongly recommended by Dr. Abraham Jacobi (*Jour. Amer. Med. Assoc.*, 1906, vol. 47, p. 1545). Dr. Jacobi claims that this method of administration is preferable to local injections, because the latter are very painful and patients are unwilling to submit to them for any length of time. He has used the internal method of administration for fourteen or fifteen years and obtained the best results from it.

The drug is given in pill form in doses of two grains a day, increasing slowly up to three, four, or six grains. Larger doses have been given, but in Dr. Jacobi's opinion, they are not required. It is a good plan to have each pill made up with the extract of belladonna, to as much as three-fourths of a grain in twenty-four hours; but if the dose of methylene blue is increased, the belladonna must not exceed the original amount. Arsenious acid, one-fortieth to one-twentieth of a grain; strychnin, one-sixtieth to one-fortieth of a grain; or nux vomica, one-half to two grains, may also be combined with the methylene blue. Patients should be warned at the beginning of the treatment that the urine will be stained blue from the drug, and that a stain on the linen cannot be removed. It is sometimes stated that methylene blue internally will cause dysuria, but in Dr. Jacobi's experience this does not often happen. He believes the use of the belladonna prevents this effect.

In many of the cases reported, the methylene-blue treatment has been effectual in relieving pain, in improving the functions of the affected part, and improvement of the general condition. Moreover, it is claimed that with the steady use of it, it is possible to avoid the use of morphin up to the last stages of the disease. Locally, there is a more healthy appearance of ulcerating surfaces with cicatrization towards the edges; the discharges become scanty and less offensive, and shrinkage occurs in the growth itself.

It occasionally happens that the administration of the drug, whether by injection or by the mouth, is followed by disagreeable symptoms. There are nausea, vomiting, a weak slow pulse, headache, and general malaise, which appear, as a rule, on the same day as the injection or the day following. Now and then there is a slight rise of temperature. Locally, there is sometimes edema around an injected area, accompanied by slight redness and pain on pressure, but these disturbances disappear quickly. The only really serious result which has been known to follow the use of the remedy is the formation of sinuses which give exit to a dark blue fluid. Sometimes a few of these softened foci join and form a swelling containing pus. When this happens, the abscess must be opened, not by the customary long slit, but by a small puncture just sufficient to let out the fluid. This accident, however, does not occur often and seems to be associated with the use of strong solutions.

The injection of methylene blue into the uterus requires not only the most rigid antisepsis, but considerable knowledge of surgery, and unless the physician has had a good deal of surgical experience, it is best for him to administer the drug by the mouth. Whichever method he employs he must make sure that the preparation of the drug that he uses is perfectly pure and unadulterated.

Thyroid Extract.—The treatment of inoperable cases of cancer by means of thyroid extract has of late been the subject of discussion. The extract may be given in substance in capsules, or the fluid extract may be used. The dose varies from four to six grains a day according to the individual susceptibility. In primary carcinoma it is best to begin with large doses, but in the recurrent form small ones answer better. Some physicians are of opinion that the remedy is more successful in secondary carcinoma than in the primary form.

Trypsin.—The use of trypsin in the treatment of carcinoma was suggested by Beard of Edinburgh, whose experiments on mice afforded the hope that it might be of great service. Opinion seems still to be divided, however, on the question of the beneficial results derived from it, and some persons have reported considerable harm arising from it, e. g., W. A. Pusey (*Jour. Am. Med. Assoc.*, 1906, vol. 46, p. 1763).

Acetone.—The treatment of inoperable carcinoma by means of acetone is strongly advocated by George Gellhorn (*Jour. Amer. Med. Assoc.*, 1907, vol. 48, p. 1400), and should the future fulfil the present promise, there is no doubt that it will be a valuable palliative form of treatment. Dr. Gellhorn experimented for eighteen months with different chemicals which he thought might offer some improvement in the existing conditions for treatment of inoperable cancer, and finally found that he obtained unexpectedly good results with acetone, in regard to which he says: "In the limited number of cases in which it has been employed it seems to have successfully met the chief requirements in the treatment of inoperable cancer of the uterus."

Acetone is present in every normal urine and is familiar to the clinician from its occurrence in the urine in diabetes mellitus, in certain forms of digestive disturbance, and in some cases of carcinoma. It is a transparent, colorless, mobile, and volatile liquid with a characteristic pungent sweetish taste and odor.

If applied to the skin, it causes a sensation of cold. Tissues placed in it shrink and harden rapidly owing to its intense hygroscopic qualities, and if left in the fluid more than half an hour they are, as a rule, too hard for the microtome knife. It was Dr. Gellhorn's idea to utilize these hardening powers for practical purposes. If the ulcerating surface of the cancer could be hardened, *in vivo*, the discharge could be checked and the escharotic portion would be cast off. The resulting free surface could then be hardened, and it would, perhaps, be possible to harden deeper portions, or even the entire tumor, thus rendering the malignant growth temporarily harmless.

The treatment must, if possible, be preceded by a thorough curetting of the ulcerating area. The curetted cavity is then carefully dried with cotton sponges, and from one-half to one ounce of acetone is poured into it through a Ferguson or some other tubular speculum. The narcosis may then be interrupted and the patient left in the position for from fifteen to thirty minutes. The acetone is then allowed to run out through the speculum by lowering the pelvis, and the cavity is packed with a narrow gauze strip soaked in acetone. The healthy mucosa of the vagina and the vulva are cleansed with sterile water and dried. After the preliminary curetting and cauterization the regular treatment is administered two or three times a week, beginning on the fourth or fifth day after the operation.

For the preliminary treatment the patient must, of course, be in a hospital or in her own house, but the further treatment may be administered in the physician's consulting room. It is done without an anesthetic and may be given with the patient on the ordinary examining table or chair. The pelvis of the patient is raised and the tubular speculum inserted into the cancerous cavity; it is then filled with acetone, and may be held in place by the patient's hand for half an hour, after which it is emptied in the manner above described. Care must be taken to prevent the acetone from running over the vulva and the perineum. As the cancerous area diminishes, smaller and smaller specula can be employed.

The immediate effect of the treatment is to check any slight oozing almost immediately. The surface of the crater is covered with a thin, whitish film, which becomes light brown wherever there is an extravasation of blood. The normal vagina is not appreciably irritated. On the vulvar mucosa and the outer skin an excess of acetone produces a faint whitish discoloration, which soon disappears. There is no pain from the cauterization, although a slight stinging sensation may be experienced if the acetone has touched the skin. This passes away rapidly, however, if the affected part is washed with cool water. Anodynes are not needed after the treatment, except in special cases. One of the most distinct beneficial effects is a marked reduction of the intense odor. The discharge beomes watery, then gradually subsides, and with it disappears the intense and disagreeable odor attending it. The hemorrhages also cease to recur, and after two or three weeks of treatment a considerable diminution in the size of the cavity may be noticed. Its walls become smooth and firm, there are no more polypoid excrescences, nor can the finger remove any friable tissue.

The absence of hemorrhages and weakening discharges causes a great improvement in the general condition of the patient; on the other hand, sensations of pain caused by the extension of the cancer to adjoining organs or nerve trunks beyond the reach of the acetone are not relieved and require the use of an anodyne as before. In Gellhorn's experiments frequent examinations of the urine were made, in order to ascertain if there was any absorption of acetone into the organism, but they were all negative.

The number of cases upon which the acetone treatment has been tried is, so far, too small to form positive conclusions; the results, so far as they go, are, nevertheless, so good that it seems reasonable to hope that a valuable palliative measure for inoperable cases has been found. Even though the pain is not affected by it, the relief from hemorrhage and from the characteristic odor, which is one of the most distressing features of the disease, recommends the treatment most highly to our notice. The ease with which it can be conducted by the general practitioner, and the absence of ill effects, add greatly to its value.

General Remedial Measures.—In all cases of inoperable cancer, every care must be taken to keep the patient's general condition as good as possible. Her digestion and appetite must be kept up by appropriate measures, and she must have as much fresh air as possible. In the use of remedies for the relief of pain the greatest caution must be exercised. It is sometimes said that there cannot be any objection to the unrestricted use of opium when there is no possibility of recovery, but it must be remembered that, unless the resources of opium are carefully husbanded, they will fail before the close of life, and the patient will be left with no protection against suffering at the time when it is most intense. Even the largest doses will at last prove ineffectual. It is best, therefore, to avoid the use of opium as long as possible, and when this can no longer be done, it must be given carefully by the physician or the nurse, and the amount modified according to necessity. The rapidity with which the disease advances, and the patient's powers of resistance must, of course, be taken into consideration.

In the beginning of the disease, before the pain has become intensely severe, relief may be obtained from the coal-tar preparations such as phenacetin, antipyrin, and others. Aspirin, the acetic ether of salicylic acid, has been highly spoken of in this connection, especially by Ludwig Goth (*Med. Blätt.*, Feb. 11, 1904). It is said to relieve pain very quickly and without disagreeable aftereffects. The dose is one gramme (fifteen grains) daily. If this dose does not give relief it is of no use to continue it.

Vaginal injections of chloral hydrate in strength of 10:1000 have been recommended for the relief of pain and also for disinfection of the vagina.

Opium is best administered at first in the form of codein, one-fourth of a grain, increased as occasion requires. When this fails it will be necessary to have recourse to opium itself, which generally does better than morphin. It is well to administer it at first disguised in some stimulant, such as wine of coca. Then the patient, not knowing what she is taking, will not learn to depend upon it so soon.

Hemorrhages, when they occur, are best controlled by douching with hot water and packing with gauze. Vinegar and ice-water have been recommended as excellent styptics. Adrenalin has been used very successfully in the hemorrhages of carcinoma. Peters (*Zeitschr. f. Gyn.*, 1904, No. 27) recommends it in normal salt solution of 1:2000 or 1:3000. This is applied for two minutes to the cavity of the uterus.

Throughout the illness the vagina should be frequently washed out with Labarraque's solution (see Chap. XIII, p. 306) as a disinfectant and deodorant. Creolin, 1:500, is also useful for this purpose.

It is of great importance to keep the surroundings of the patient as cheerful as possible. A good nurse is invaluable in keeping up a bright pleasant atmosphere, where relatives are often too much depressed to do so. In regard to the question of allowing the patient to have a knowledge of her own condition, there is much difference of opinion, some persons holding that it is best to keep her in entire ignorance on the subject. If it is possible to keep her contented and at peace while in ignorance, no doubt it is the most desirable state of things, but if she supposes that a knowledge of her real condition is being withheld from her, uncertainty and suspicion may react most unfavorably on her. If she asks direct questions they should be truthfully answered, and if she seems to be fretting in silence it is best to draw out exactly what are the extent of her suspicions and deal with them as fully as seems necessary to satisfy her peace of mind. Under any circumstances, her family, or at any rate some responsible member of it, should be fully informed of the nature of the disease and the extent of its progress.

CHAPTER XXII.

CYSTITIS.

Definition, p. 519. Classification, p. 519. Etiology, p. 520. Symptoms, p. 523. Diagnosis, p. 524. Treatment, p. 530.

DEFINITION.

Cystitis is an inflammation of the bladder, caused by microorganisms; it is associated with the discharge of pus and sometimes of blood in the act of urination, which, as a rule, is increased in frequency and painful. Cystitis is, therefore, an inflammatory affection and must be distinguished from simple hyperemias, such as are often found in the trigonum of the bladder and present many appearances of inflammation, but without any evidences of infection and without pus in the urine. Cystitis is also readily distinguished from the frequent urination (pollakiuria) often noted in nervous patients, or in those whose urine contains some irritating substance.

CLASSIFICATION.

There are different kinds of cystitis, and it may be classified in a variety of ways. First, according to the intensity of the disease. In some cases it is so mild as to escape the attention of the patient; in others, so intense as to make life itself a burden.

Second, into acute and chronic forms, a most important classification. The acute are marked by suddenness of onset and intensity of symptoms, but they are of short duration, passing soon into the chronic stage. Most cases develop slowly and are chronic from the first.

Third, according to location. The patch of cystitis may be seated in the vault of the bladder, in the posterior wall, or at the base. The disease may be limited to one of these foci, or it may spread out from one or from several of them until the entire bladder wall has an angry, beefy-red appearance.

Fourth, according to the character of the infecting organism. By this classification we have:

Tubercular cystitis.
Gonorrheal cystitis.
Colon bacillus cystitis.
Proteus cystitis.
Streptococcus cystitis.
Staphylococcus cystitis.

Several rarer forms of more interest to the bacteriologist than to the practitioner.

Fifth, according to the portal of infection. When the bladder is infected by organisms carried directly to it by the blood, the infection is primary; and when the organisms proceed from a focus of infection in some other organ, as the kidney or one of the uterine tubes, it is secondary.

Sixth, according to the direction in which it progresses. Cystitis is ascending when the infection is introduced from below, and ascends from the urethra upwards; descending when it is introduced above, and proceeds from the kidney downwards.

A latent cystitis is not infrequently seen in surgical patients, examined as a matter of routine for urinary infections before operation, whether they complain of any bladder symptoms or not. This group of cases is an important one, as the recognition of the disease before operation in any given case relieves the surgeon of responsibility, and refutes any imputation of having caused the trouble by neglect, in the event of an exacerbation during convalescence.

ETIOLOGY.

The commonest source of cystitis in these days is the urinary catheter, especially when employed during the puerperal period or after surgical operations. Put a catheter in unskilled hands, and cystitis is pretty sure to follow its use. The blame for lack of skill may fall upon the shoulders of the doctor, as well as of the nurse, the latter of whom is too often made a scapegoat. I know of an instance of an old practitioner who catheterized a patient in hard labor, introducing the catheter several times. The baby was born dead and a number of curious little holes were found punched into its brains. These were produced by the catheter, which had been forced through the urethra and then through the baby's skull. An unclean catheter will cause cystitis in the vast majority of cases, but with proper attention to cleanliness no trouble will ordinarily arise from its use.

The reason cystitis so often dates from confinement, and especially from repeated catheterization in the puerperal period, lies in the fact that in difficult labor the bladder is always more or less injured, the resisting powers of the patient are lowered, and the lochia bathing the external genitals and the urethra are a constant source of infection. Added to this is the awkward position of the patient as she lies in bed and the swollen condition of the vulva. A catheter introduced under such circumstances, even if considerable care is taken, is pretty sure to convey some infection.

The cystitis which arises after an operation is also occasionally unavoidable, even with the best skill and technic. This is undoubtedly due to the reduced condition of the patient, who has passed through the shock of an operation and whose reparative processes are consequently much below par. Under these circumstances she is unable to resist an infection which would be easily thrown off under normal conditions. The attending circumstances of pelvic operations are frequently so damaging to the bladder that the wonder is, not that we have cystitis, but that it does not develop oftener. Take, for example, a hysteromyomectomy or an abdominal hysterectomy for carcinoma, and we have to do with patients under conditions most favorable for the development of cystitis, as follows:

(1) A depressed state of health before operation.

(2) Often a condition of severe mental depression.

(3) A severe mutilating operation.

(4) Severe trauma exercised upon the bladder itself.

(5) In some cases, protraction of the operation which taxes the vital forces to their utmost.

(6) Considerable, sometimes excessive loss of blood.

(7) In the case of carcinoma, injury of the bladder at the point of detachment from the uterus and the vagina, an injury which must heal by suppuration during convalescence.

(8) Constraint of posture after operation, when the patient lies on her back and is unable to empty her bladder properly on account of the unusual position, so that there is either an overdistention or a residuum of urine after voiding.

(9) Complications during convalescence causing elevation of temperature, which further lowers resistance.

With all these favoring conditions it is not remarkable, as I have said before, that cystitis is a common complication of the convalescence in pelvic surgical cases. The reason for the frequency of cystitis in those cases which have to be catheterized repeatedly, is found in the fact that the external urethra and the parts of the urinary canal adjacent to the external orifice are normally the habitat of a profuse bacterial flora, especially the colon bacillus.

The history of a patient suffering from cystitis often throws great light upon the case. In young women and unmarried women, where the disease is seen in an aggravated form and there is a history of suffering of years' standing, where the urine is cloudy, and there is a continual desire for urination night and day, the disease is apt to be tubercular, and to arise from a tubercular infection of one or, it may be, both kidneys. Often there is no complaint whatever of any discomfort in the loin, even with an aggravated disease in the kidney. These cases are frequently mistaken for primary vesical tuberculosis, whereas a primary tuberculosis of the bladder is one of the rarest of urinary affections. In women, a vesical tuberculosis is almost always descending from the kidney; while in men, it may be ascending from the genital organs or descending through the ureters.

Again, a patient, a married woman, may state that she dates all her vesical difficulties from a confinement, when it was necessary to catheterize her frequently. Cases of this kind are, as a rule, colon bacillus infections. Sometimes the patient blames a physician or a nurse unjustly, in response to the desire natural to human nature to find fault with some other person when anything goes wrong.

In taking a history, the actual present condition should first be inquired into as follows:

How often the patient urinates?
How frequently at night?
How much pain in the act?
When the pain is most intense?
How long the pain lasts?
Is it possible to control the bladder when the desire for urination occurs?
Is the trouble tending to get better or worse?
Is it affected by menstruation?
Is it worse when the bowels move?

When these points are settled it is best to go back in the history and ask:

How and when did the urinary difficulty begin?
When was the patient last perfectly well?
Does the trouble date from any particular event, such as a confinement or an operation?
Is it attributable to catching cold?
Did it begin in a severe form, or with a slight distress, increasing frequency of urination, and pain?
Did it, perhaps, begin with frequency of urination without any pain at all?
What treatment, if any, has been tried up to the time of inquiry?

I give here two typical histories, one in which the pain began sharply and the cystitis is referred to a particular event; another where the cystitis came on gradually, from no known cause.

Case I.—Mrs. A. L. M., age forty, April, 1907 (San. No. 2421). This patient complained of a bloody discharge, which proved to be due to cancer of the cervix uteri. Her family history was negative, she had always had good health, and was the mother of four children. Up to the time of her admission to my private hospital she had never had any bladder or kidney trouble, and the urinary examination showed clear urine, a specific gravity of 1.018, acid reaction, no sugar, no albumen, and no abnormal microscopical elements. The cervical cancer was favorable for operation, as it was still limited to the uterus. An abdominal pan-hysterectomy, after the method of Wertheim, was performed. Subsequent to operation the patient had to be catheterized, and three days later she began to have intense burning pain in the bladder with a great desire to void urine. The pain was excruciating. Examination of the urine showed abundant pus, some red blood cells, considerable bladder epithelium, and a pure culture of the colon bacillus. The patient was at once put on urotropin, fifteen grains three times daily, and was given all the water she could drink. In addition to these remedies, the bladder was irrigated daily with a solution of boracic acid. After the first few days the pain and discomfort ceased, but for a month there continued to be some pus cells present in the urine and some bacteria, and it was not until nearly six weeks after the operation that the urine was perfectly normal. The patient was discharged a few days later, and went home cured of her cancer and relieved of her cystitis.

Case II.—Miss E. R., age twenty-seven, May, 1907 (San. No. 2443). This patient complained of pain and frequency of urination. Her family history was entirely negative as to bladder disease or nervous ailments. Her health had never been strong, though appetite and digestion were always good. Menstruation had been always regular, painless, and in every way normal. The bladder trouble had begun insidiously three years before. At first there was nothing more than a slight increase in the frequency of urination, but this increased gradually and became associated with pain. The condition continued to develop in spite of local treatment carried out by her physician, until the patient had lost much flesh and was in a great deal of pain. The urine, examined on the day of her admission to my private hospital, was of normal acidity, with a specific gravity of 1.030; it contained no pus, no blood, no casts, and no bacteria. Examination of the bladder showed it to be of normal size with about four hundred cubic centimetres' capacity. Its appearance was normal everywhere except for an area of reddening and ulceration in the vertex, lying in a transverse direction. This was about four centimetres long by one wide. The ureteral orifices were perfectly normal and secreting actively. An attempt was made to treat this patient by local applications and by irrigations, but the treatment caused such intense pain that it had to be abandoned. I then made a suprapubic opening into the bladder and excised the ulcer as well as another small piece of the bladder, which was reddened. The wounds in the bladder were sewed up with catgut and the suprapubic opening closed with it. The healing was prompt and the relief almost immediate. The second examination of the urine in this case disclosed a colon bacillus infection with some pus, and this persisted until after the operation. When the patient finally left the hospital there was no infection and no pus in the urine.

A case of this kind, in a young unmarried woman, coming on insidiously, and with an almost clear urine, is highly suggestive of tuberculosis; in this case it was only after the administration of tuberculin and the repeated inoculation of guinea-pigs with negative results that it was excluded.

SYMPTOMS.

Local Symptoms.—Frequency of micturition is one of the cardinal symptoms of cystitis, and there is no true cystitis without it, yet on the other hand there may be urgent desire and great frequency without any cystitis at all. This is the rock on which the general practitioner is often wrecked, when he hazards making a diagnosis of cystitis from frequency of urination alone. The frequency varies from an evacuation every hour or half hour to one every ten or fifteen minutes day and night, or to a constant tenesmus and strangury.

The desire to void oftener than usual is, as a rule, the first symptom noted by the patient and the last to subside, often persisting even after the entire disappearance of pus and bacteria from the urine. Frequent urination, therefore, and pain, are the chief symptoms by which the patient judges as to her own improvement.

Pain is a symptom not always felt at first; it usually follows frequency of urination. When felt it is localized in the bladder and does not radiate; it is of a burning, cutting, bearing-down character, and varies from a simple annoyance at the time of urination or before it to an aggravated continual suffering, from which there is no relief, day or night. The pain of a cystitis is easily provoked by the introduction of a sound into the bladder, a proceeding which is often followed by bleeding.

In all cases of cystitis, the pelvis ought to be examined as a matter of routine, to see if there is any tumor pressing on the bladder or any inflammatory disease about the uterus.

The presence of pus in the urine may simply be due to a lingering gonorrheal urethritis, which is usually manifested by a reddened sensitive external urethral orifice. A pyelitis is distinguished by the presence of pus in the urine, without the presence of the other signs of a cystitis, and also by the amount of albumen found in the urine, which is larger than can be accounted for by the amount of pus found. A urologist, by catheterizing the ureter, will be able to trace the pus to its source above. As I have said elsewhere, an acid pyuria, without organisms easily found and growing on the common culture media such as agar or gelatin, is due, as a rule, to a tubercular kidney.

General Symptoms.—Fever, headache, loss of appetite, constipation, and emaciation, are noted only in the most aggravated cases of cystitis. By the time the patient is so far reduced, she keeps her bed, as a rule, all the time. In the presence of such general symptoms, especially if they persist, the practitioner should quickly make up his mind that he is dealing with some severer trouble of which the cystitis is only a part. In the vast majority of such cases the trouble is a kidney infection.

DIAGNOSIS.

There can be little doubt that a cystitis exists when the patient is troubled with frequent urination and passes milky or turbid urine with pain. It is important to examine the urine immediately when passed, so as not to mistake urine rendered cloudy by chilling and deposition of phosphates for infected urine carrying pus. Only the more marked cases of cystitis can be diagnosed in this rough manner. The better plan is to cleanse the orifice of the urethra thoroughly, take a catheterized specimen, and either examine it microscopically, or send it to a pathologist for examination and report. Five grains of chloral or ten drops of chloroform to the ounce will keep the urine from undergoing decomposition on the way.

I might lay down the general rule that whenever a patient complains of frequency of urination and the trouble is persistent, the physician should make a microscopic examination of the urine. If the urine has been voided, two serious sources of contamination must always be allowed for: first, a little admixture of leucorrheal discharge furnishes pus, and in the second place smegma bacilli often give rise to a faulty diagnosis of tuberculosis. It is necessary, therefore, in case pus or suspected tubercle bacilli are found, to secure a catheterized specimen for the next examination. This will often relieve a seemingly serious situation.

The practitioner, if inclined to do a little experimental work with a guinea-pig, can easily clear up the diagnosis of a tubercular cystitis by collecting a little of the sediment of the urine in a hypodermic syringe and injecting it under the skin of the groin of a guinea-pig, after carefully washing and shaving the area to be punctured. If tubercle bacilli are present, distinct nodules can be felt two or three weeks afterward in the enlarging inguinal glands, and if the animal is killed a little later, the tubercular glands are easily recognized. A small dose of tuberculin, say one to three miligrams, given under the skin, will also provoke a decided fever when the disease is tubercular, the temperature rising to 103°, 104°, 105° F., with marked local reaction at the site of the disease. The local reaction manifests itself in pain and also by the excretion of bacteria and pus in the urine.

If pus is found in the voided urine, it must be remembered that it may come from the kidney, even when the patient has definite vesical symptoms. The general rule may be laid down that in every case of cystitis, the kidneys must be borne in mind by the investigator from the very beginning of his treatment to the end, unless he is able himself, or has called in a friend skilled in urology, to catheterize the ureters, and to prove that while urine containing pus comes from the bladder, that which comes from the kidneys is free from it.

Whenever there is any fever associated with a cystitis, for which there is no other obvious cause, and such conditions as malaria are excluded by blood examinations, the examiner must always suspect a latent pyelitis as the primary source of the cystitis or of the cystic symptoms. A pyelitis of this kind often gives rise to no symptoms whatever tending to draw attention to its existence.

A valuable fact to bear in mind here, is that in pyelitis the percentage proportion of albumen is generally markedly greater than that found in a cystitis containing a like amount of pus. Moreover, the cystitis albumen ring is thin and faint, while pyelitis in the greater number of cases yields a well-defined ring.

When there is a proteus infection and in consequence an alkaline urine, the pus cells become converted into a mucoid substance, the urine is slimy and stringy, and contains no well-defined pus cells which can be seen under the microscope. This form of cystitis may be paradoxically called a pyuria without pus.

As already said, a patient who has a persistent acid pyuria, lasting for months and years and slowly getting worse, has, as a rule, a tubercular kidney. The great majority of tubercular kidneys give such a history as this and they generally suffer for years before the disease is recognized. When a patient has a pyuria with some symptoms of cystitis and no bacteria are found in the urine, after making the usual examination, it must always be remembered that the later histories of similar cases have often proved them to be tubercular. The colon bacillus is the commonest infecting organism, and it may follow the introduction of an unclean catheter, or even repeated catheterizations carefully performed, in the puerperal period or after gynecological operations when resistance is lowered. An intense distressing cystitis, with pus and blood in an alkaline urine, due to a proteus infection, is often encountered. The physician ought not to continue to treat a case indefinitely; unless he notes marked improvement as the result of his efforts; if he does not, it is imperative to directly inspect the bladder through an open-air cystoscope (see Fig. 150). There are urologists in every large city who are familiar with these instruments and capable of using them skilfully. Many general practitioners, especially those accustomed to use throat instruments, find themselves perfectly competent to employ these little instruments, to examine the bladder, to make a diagnosis, and to apply treatments. It is true that the cystoscope has thus far rested for the most part in the hands of specialists, but that is simply because it is comparatively new and its field is a new one; moreover, the technic of the treatment of these disorders has been in the process of evolution. Now that all difficulties and obstacles are overcome, there is no reason why the general practitioner should not take over as much of this work as he has inclination and skill to assume.

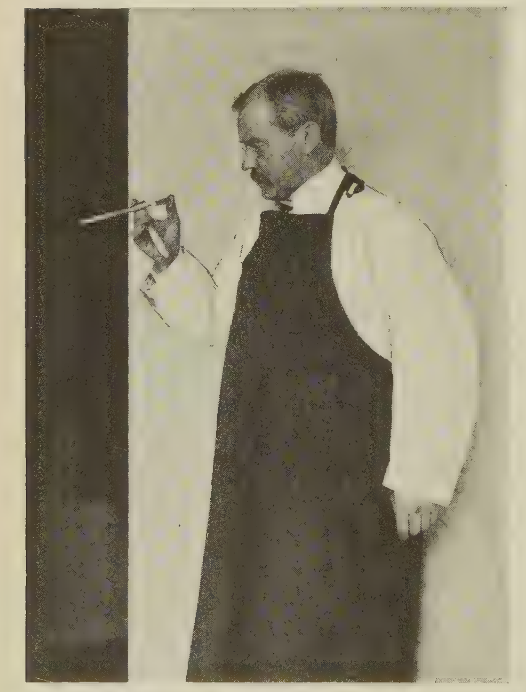

FIG. 150.—SHOWS MANNER OF HOLDING CYSTOSCOPE, PREPARATORY TO ITS INTRODUCTION INTO THE BLADDER. The thumb presses upon the handle of the obturator.

The examination is made with the following instruments and accessories:

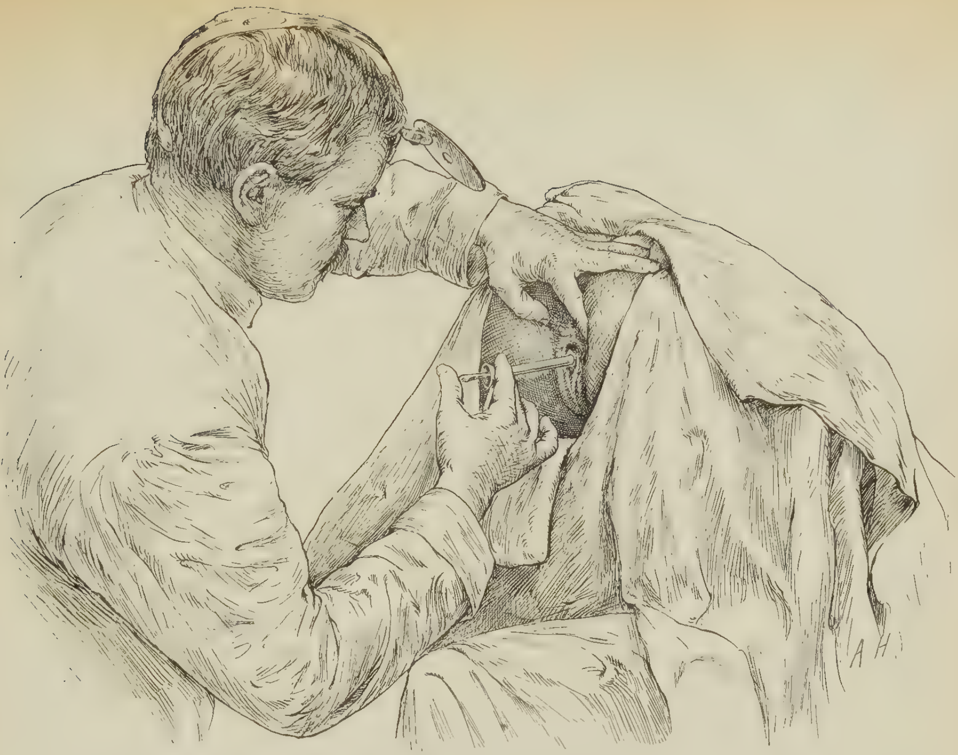

FIG. 151.—SHOWS PATIENT IN THE KNEE-BREAST POSTURE. The left hand of the examiner separates the labia and exposes the urethra, while the right hand begins the introduction of the cystoscope. Note the upward direction which the cystoscope first takes.

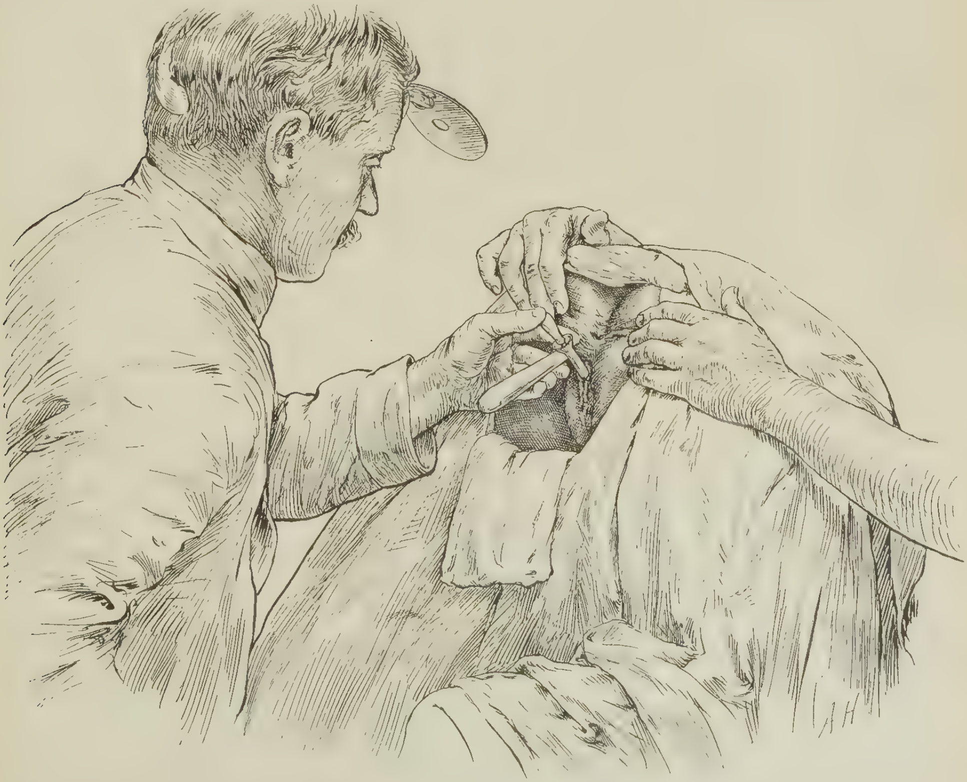

FIG. 152.—SHOWS CYSTOSCOPE IN PLACE. Note the change in direction which has taken place in the axis of the cystoscope, which is now pointed to the posterior wall of the symphysis pubis.

A little pledget of cotton tied to a thread to convey cocain into the urethra.

A calibrator or dilator to dilate the external urethral orifice.

A speculum with which to look into the bladder.

A head mirror to reflect an electric light or daylight into the bladder.

A simple suction apparatus to empty the bladder of any remaining urine.

An applicator for treatments.

An examination of this kind can be made, as a rule, under local anesthesia by inserting a pledget, saturated with a ten per cent solution of cocain, just inside the urethral orifice. In ten minutes the mucosa will be so benumbed that the little conical dilator can be inserted, and, with a rapid movement, the urethra can be stretched wide enough to admit a No. 10 speculum (ten millimetres in diameter). The speculum is then introduced, as shown in the figures (see Figs. 151 and 152), the patient being in the knee-breast posture. It must be remembered that the urethra describes an arc around the symphysis, and in introducing the speculum, it must be made to follow a similar arc. The light is then reflected into the bladder from the head mirror, and the entire inner surface can be easily inspected (see Fig. 153). If there is an accumulation of urine in the vertex, it can be removed with the suction apparatus

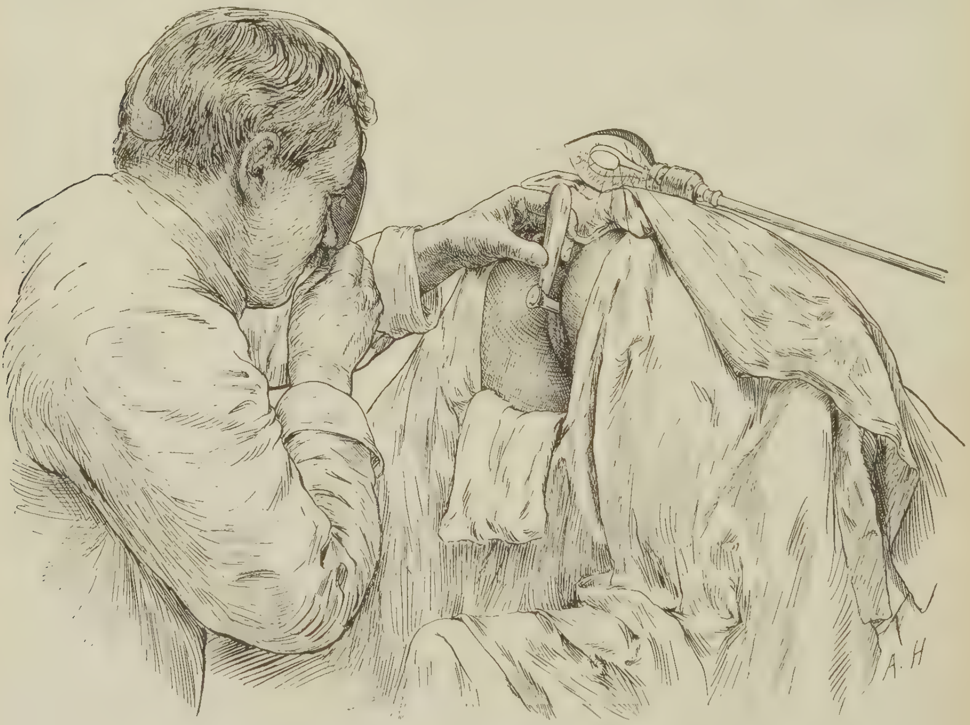

FIG. 153.—SHOWS OBTURATOR REMOVED AND THE METHOD OF USING LIGHT AND HEAD MIRROR IN THE INSPECTION OF THE INTERIOR OF THE BLADDER.

(see Fig. 154). If this apparatus is sterile, uncontaminated urine can thus be secured and examined bacteriologically as well as chemically. If the bladder is in a very bad condition, it is preferable to make the first examination under complete anesthesia, so as to avoid suffering and any straining efforts. In looking into a normal bladder, the walls appear dull and whitish, and are traversed by vessels like the background of the eye, which divide up like the little branches of a stream, leaving between them the whitish non-vascular areas. When there is any inflammation, the white areas become flushed, pale red, or rose red, or even intensely beefy red. The mucosa swells and becomes hazy, and the vessels disappear, until, in the most severe cases, no vessels at all are visible. In milder cases of inflammation, the cystitis is seen to be localized about the trigonum, or upon the posterior wall, or at the vertex. There is often an intense area of inflammation, which gradually shades off into neighboring sound tissues.

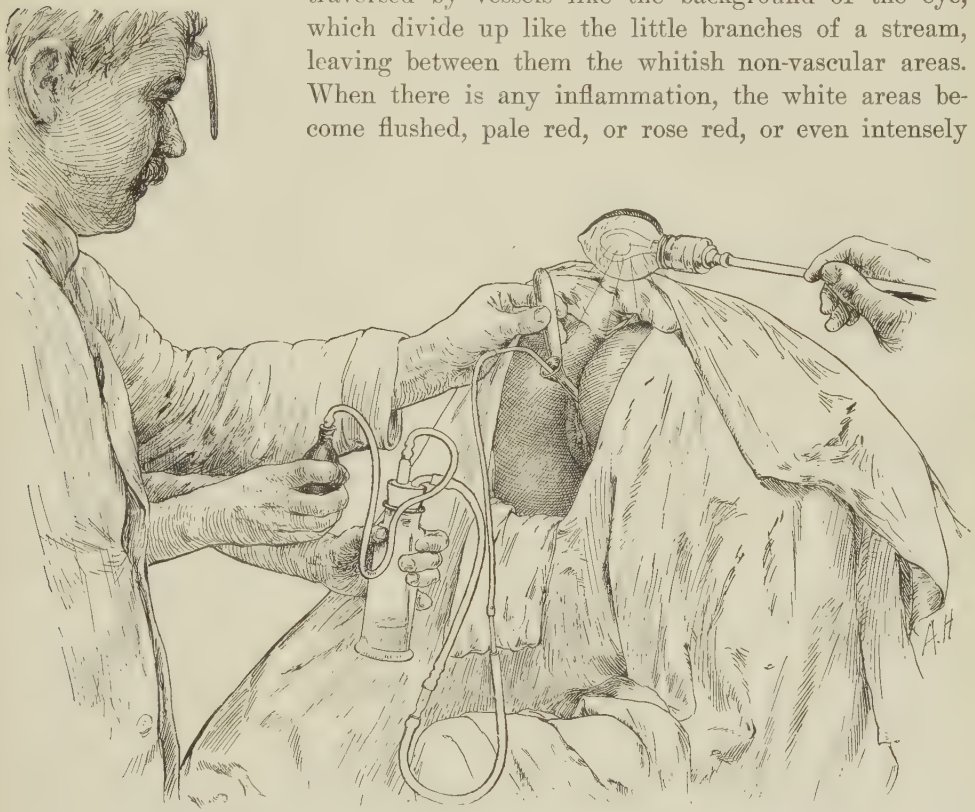

Fig. 154.—Illustrates the Use of Suction Apparatus for Removing Urine which Accumulates in the Bladder during Examination.

Our present conception of cystitis influenced as it has been by these local examinations is very different from that entertained two decades ago. The idea of cystitis then was that the whole inner surface of the bladder was inflamed. Now it is known that the patchy cystitis, with areas of normal bladder mucosa between the inflamed foci, is much the commonest form.

I cannot lay too great emphasis upon the importance of not making a diagnosis of cystitis from the symptoms of frequent and painful micturition alone. These two symptoms may be found with stone in the kidney, stone or foreign body in the bladder, or the irritation produced by a neighboring gynecological inflammation. To make a probable diagnosis of cystitis there must be the added element of pus in the urine; though even here the disease may not reside in the bladder but in the renal pelvis above, in some exceptional cases. The crucial sign of cystitis is the inflamed bladder as seen through the cystoscope.

Tubercular forms of cystitis are apt to show areas of ulceration, and if, as is usually the case, the disease is a descending one, the most marked ulceration is around the ureteral orifice of the affected side. Distinct tubercles are not often seen. In proteus cystitis, the bladder shows patches of intense, almost glistening white concretions, seated on a base of intense inflammation. The value of such a local examination is evidently very great. Not only is it a source of encouragement to see that the disease is often more localized than had been suspected, but it is valuable for the sake of comparison from week to week in determining whether or not the patient is improving, or whether there is some rebellious area which refuses to advance further on the road toward healing.

Differential Diagnosis.—Cystitis may be confused with simple frequent urination (pollakiuria).

Trigonal hyperemia.

Pelvic tumors and inflammatory conditions.

Urethritis.

Ureteritis.

Pyelitis of various kinds.

Tuberculosis of the kidney.

Stone in the bladder and kidney.

If pus and bacteria are absent the disease cannot be a cystitis, even though the patient urinates frequently. Frequent urination of this kind is found in diabetes, as well as in hyperemia of the trigonum of the bladder in nervous patients, where the urine is excessively acid.

TREATMENT.

Preventive Treatment.—Here as elsewhere in medicine, it is far more important to prevent the disease and all its attendant suffering, than to cure it when already arisen; for it is always easier to prevent a disease than to cure it. Many cases of cystitis could, undoubtedly, be avoided by careful prophylaxis. These are, especially, those which follow confinements and surgical operations, when it is very important to watch the bladder and to make sure that it does not become overdistended, atonic, and liable to accumulate large amounts of residual urine which is prone, in the weakened condition of the patient, to become foul.

Following confinements it is important to steer between difficult extremes: on one hand catheterizing too often, and on the other hand, not often enough when there is a tendency to overdistention of the bladder. It is a good plan in a first confinement to teach the patient before delivery how to use a bedpan in emptying the bladder as she lies on her back in bed. If the bladder can be felt after confinement distended above the symphysis, it ought to be emptied. One important way of avoiding overdistention of the bladder is always to use the catheter to empty it before applying the obstetric forceps. The discharges are kept sweeter and cleaner, if every time the patient is changed or catheterized, a powder (one part iodoform and seven parts boric acid) is sprinkled within the outlet.

Not uncommonly, a patient who is voiding very frequently is really suffering from overdistention of her bladder. If there is much lower abdominal pain, and a careful palpation of the lower abdomen or vaginal examination justifies the suspicion that the bladder is overdistended, the question is quickly set at rest by catheterization.

On the other hand, it is necessary to be careful not to interfere too early or too often. There is, on the part of some surgeons, a tendency to meddle too much with the bladder and to catheterize with too great a regularity. There should be no prescribed rule establishing the use of the catheter in all cases at certain intervals of time. Many patients, if they are allowed to suffer a little inconvenience from the distending bladder, will, from this very fact, urinate spontaneously after waiting a while, and will then be able to take care of the vesical function themselves. Moreover, if the catheter is resorted to early, the patient becomes dependent upon it, and its use may have to be continued for several weeks. With the protracted use of the catheter, the risk of infecting the bladder is enormously enhanced, and, like the pitcher which goes often to the well, the break in the technic with resulting infection occurs at last, and cystitis is established.

As regards the avoidance of post-operative cystitis, too much importance cannot be laid upon not using the catheter at all. A patient, even after a severe operation, had better be propped up in bed supported by her nurse than undergo a catheterization. It is also advantageous to teach the patient to void urine when lying down before the operation. In the last two thousand cases in my service at the Johns Hopkins Hospital the patients were not catheterized and there were only twenty-four cases of marked cystitis after operation. This is in decided contrast to our old records, where every patient was catheterized as a matter of routine for a number of days. Twenty-two of these twenty-four cases followed abdominal operations; but in all of them cystitis developed afterwards, in spite of the fact that there was no catheterization. The average case of post-operative cystitis, due to catheterization of the urethra when there has been no serious disturbance of the bladder by operation, is a mild affair and yields readily to treatment. On the other hand, in the extensive operations necessitated by cancer of the cervix, there is such destruction, of both the vascularization and the innervation of the bladder, that a cystitis may develop which is extremely obstinate and in some cases incurable.

In using the catheter all necessary precautions should be taken in every instance. In the first place, the nurse or the doctor who handles infected cases ought to wash the hands thoroughly, scrubbing them with soap and hot water after every treatment, as well as before each new treatment. The patient to be catheterized is then:

(1) Exposed as she lies upon her back, with knees drawn up and separated. The vulva is held widely open with thumb and forefinger of the left hand, so as to give a perfect exposure of the urethral orifice.

(2) It is a good plan to draw a little rubber finger cot on thumb and forefinger of right hand.

(3) A sterile dish containing a warm boric acid solution and some pledgets of cotton about three centimetres in diameter, should be placed on the bed not far away from the genitalia.

(4) A gauze or cotton pad is placed under the patient, or perhaps a curved basin.

(5) The nurse then takes up the cotton in the boric acid solution with a pair of sterile forceps.

(6) She cleanses thoroughly the urethral orifice and the adjacent portions of the vestibule, using several pledgets of cotton one after the other, and applying the solution effectively, but taking care not to rub hard, and not to hurt the patient or abrade the delicate tissues. Having thus cleansed the field she then takes a sterile glass catheter from a receptacle. The catheter with a piece of rubber tubing on the end, three or four inches long, is held delicately poised between thumb and index finger.

(7) The end of the catheter is dipped in sterile sweet oil, introduced into the urethral orifice, and with a slightly curved motion, following the curve of the under surface of the symphysis by dropping the outer end as it is carried upwards and inwards, it is introduced into the bladder. The catheter must never be grasped firmly with the fist, as though the nurse were determined to overcome any obstacles encountered by a main force; neither must it be pushed straight in, as though the urethra were a straight tube.

(8) The urine running out of the rubber tube is collected for examination, if desired, in a suitable vessel. Uncontaminated urine is easily secured for bacteriological examination by drawing the rubber tube off from the end of the catheter while the urine is still running, and letting a few drops or a few cubic centimetres run into a sterile agar tube.

Unless the nurse is skilled in catheterizing she would do better, I think, to use a soft-rubber catheter, which finds its own way up the urethra.

The two objects in catheterization are, first, to introduce the catheter without carrying in any infectious material, which is effected by exposure and cleanliness; and, second, to avoid any trauma or laceration of the urethral mucosa. If the second rule is observed the catheterization is done without hurting the patient at all.

I am aware that the above method of catheterization sounds very much like a small surgical operation, but unless all these precautions are taken, it is impossible to avoid causing a certain number of distressing cases of cystitis, and it is a matter of primary importance that our nurses, as well as our practitioners, should be taught to consider this little procedure as parallel in dignity to a minor surgical procedure. It is the constant necessity of exercising such care as this in every relationship between themselves and the patient which raises the calling of physician and nurse to the dignity of a skilled profession, and makes the difference between a true practitioner and a quack. When the physician finds that it is going to be necessary to catheterize his patient more or less frequently during a convalescence, as after a severe confinement, one of the best prophylactic agencies is the use of urotropin, say ten grains three times a day until the danger of infection is over. Urotropin finds its best field as a preventive in such cases, and as an indispensable adjuvant in treating fresh infections; it is less effective in old, well-established cases of cystitis. It seems to have more effect upon the colon bacillus than upon any other organism; it is useless in cases of tuberculosis, and is probably most effective in cases of cystitis and pyelitis following typhoid fever. In surgical cases, prophylaxis can do a great deal to prevent cystitis following and complicating the convalescence. With this in view, the surgeon should handle the bladder as little as possible and avoid all bruising of its tissues, especially any violence in rubbing down or detaching the bladder from the cervix uteri. If the bladder is widely detached from the uterus, as in hysterectomy, the vaginal and peritoneal surfaces should be brought together so as to cover over the wounded surfaces and limit the area of suppuration, protecting the bladder. In our hysterectomies for cancer of the cervix, my former resident, Dr. John A. Sampson, found that a drainage of the bladder by artificial vesico-vaginal fistula prevented the occurrence of cystitis, which was exceedingly common without it.

Treatment of an Existing Cystitis.—In treating a cystitis which has already become established, we must at once separate those cases which come on in the young gradually and without apparent cause, or with such an alleged cause as catching cold, as well as cases of long standing, from those which have begun within a period of, say, a few weeks, from some easily assignable cause, such as a trauma from operation or a confinement. Cystitis in the young is very apt to be due to a tubercular infection, and this fact must always be borne in mind until the nature of the infecting organism is definitely and positively known. All persistent acid pyurias in young people are presumptively tubercular until the contrary is proved. If tubercle bacilli are found in the urine, the case is not one which is amenable to medical treatment. When tubercle bacilli are found, the case is almost certainly one of tuberculosis of the kidney, with secondary involvement of the bladder. It is often hard to convince a general practitioner of this fact, because these patients not only frequently complain first of the bladder, but ofttimes the entire complaint throughout the whole illness is vesical, so that great astonishment is expressed when the conjecture is hazarded by the specialist that the kidney is the real seat of the disease.

A gonorrheal cystitis usually dates from a florid attack of gonorrhea, affecting the genitalia as well as the urinary organs, and beginning with an acute urethritis and cystitis.

It is important to remember that an infection, primarily tubercular, is often followed by the invasion of other pus-producing organisms, which cause more or less extensive suppuration and a marked febrile reaction. Albarran, of Paris, has drawn particular attention to this class of cases.

A cystitis beginning to run an acute course, with frequent urination and the passage of pus, mucus, and blood, ought not to be subjected to any active local treatments. Catheterizations and irrigations, and local medications of all sorts, as a rule, only serve to aggravate the disease, which often tends to heal spontaneously without meddlesome interferences. The best treatment for an acute cystitis is absolute rest in bed, a nutritious soft or liquid diet, and abundant diluents by the mouth, say a tumbler of water containing twenty grains of citrate of potash every two hours. If the pain is severe, a belladonna and opium suppository is the best sedative we can use.

℞ Extract of opium	gr. $\frac{1}{2}$
Extract of belladonna	gr. $\frac{1}{4}$
Ol. theobromæ	q. s.

M. et ft. suppository 1. Mitte tales vj.
S. One suppository every 6 to 8 hours if pain is severe.

A good suppository is:

℞ Trional	gr. x
Codeiæ	gr. $\frac{1}{4}$

M. et ft. suppository 1.

I would, as a rule, confine the patient to a milk diet or its equivalent, and allow fruits, but cut off all red meats and condiments. A prolonged hot vaginal douche (110° F.) given for ten to fifteen minutes twice a day may alleviate the inflammation. Hot applications, poultices, or fomentations of flannel wrung out of hot water over the lower abdomen are valuable adjuvants.

Urotropin should be given, five grains every three or four hours for some days at the beginning. If this makes the urine more irritating, the dose should be lessened or suspended.

A good mixture in the acid cases is:

℞ Pot. citrat. .... ʒjv
Tr. hyoscyami .... fʒvj
Elix. simpl. ....q. s. ad. f℥vj
S. Tablespoonful every 2–3 hours in water.

I find the following drugs of occasional assistance: Fluid extract of triticum rejens, fluid extract of zea mais, oil of sandal wood, copaiba, methylene blue, sweet spirits of nitre.

I do not know anything as to the real value of the old remedies once held in such repute, namely, uva ursi, buchu, pareira brava, pipsissewa, The methylene blue in doses of three grains three times a day, in capsules, sometimes quiets pain, but does not control the disease.

Triticum and zea mais serve to make the urine bland, given in doses of half a teaspoonful, well diluted, every three or four hours. Oil of sandal wood and copaiba are given in five to ten minim capsules after food. They sometimes do good, but oftener they upset the stomach. Sweet spirits of nitre in doses of one teaspoonful every two or three hours, well diluted, also relieves pain and is valuable in mild cases. Tincture of hyoscyamus in thirty drop doses may be given every two or three hours by mouth. It is well to dilute freely all medicines taken by mouth.

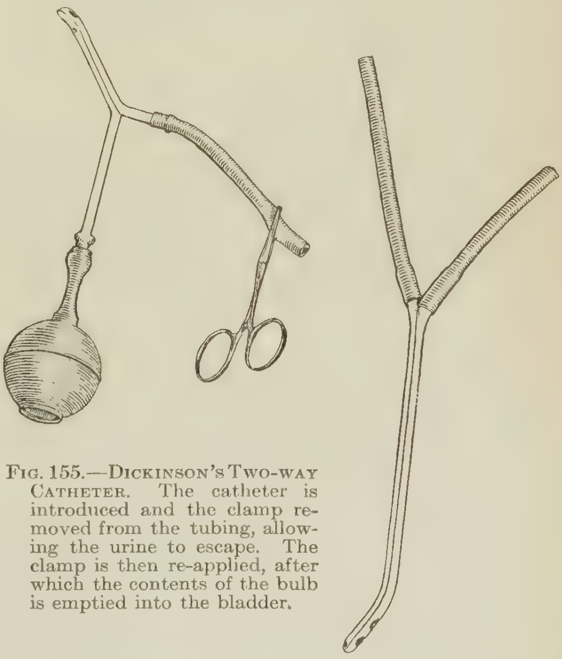

Fig. 155.—Dickinson's Two-way Catheter. The catheter is introduced and the clamp removed from the tubing, allowing the urine to escape. The clamp is then re-applied, after which the contents of the bulb is emptied into the bladder.

If instead of subsiding, the case continues to run a peracute course, as in diphtheritic cystitis or in the sloughing form following a severe labor, but one plan of treatment is left, and that is to open and drain the bladder through the vagina. These drainage cases are very much helped by placing the patient in a hot water bath for several hours every day (Hunner).

Local Therapy. — In cystitis which is not running an acute course, local therapy can do a great deal. I would advise the following plan: (1) The symptoms should be carefully and minutely written out: frequency of urination, etc., amount and character of pain, the appearance of the urine, and the amount of sediment of pus after standing for a definite length of time.

(2) A short course of treatment, lasting a few weeks, should then be insti-

tuted. The plan must be definite, and the physician should make up his mind not to continue it indefinitely, but to abandon it for a more aggressive course in case there is no marked improvement in a reasonable period of time. A mild course of treatment consists in rest, keeping the patient at the same time as much in the fresh air as possible, and in the winter out in the sunshine, the due regulation of the bowels, and daily or every other day treatments of the bladder. The simplest plan of treatment is the following: A Dickinson two-way glass catheter (see Fig. 155) is used, with a bulb holding about an ounce of a 1:1500 nitrate of silver solution on the upper catheter. The catheter is introduced with extreme gentleness, and the urine in the bladder allowed to run out. Then after stopping up the lower end of the catheter, the bulb is slowly squeezed until the silver solution is forced into the bladder. The patient retains this fifteen or twenty minutes, if possible, before voiding again. If the 1:1500 solution gives no discomfort, the strength should gradually be increased until 1:1000, 1:500, or even 1:100 is used.

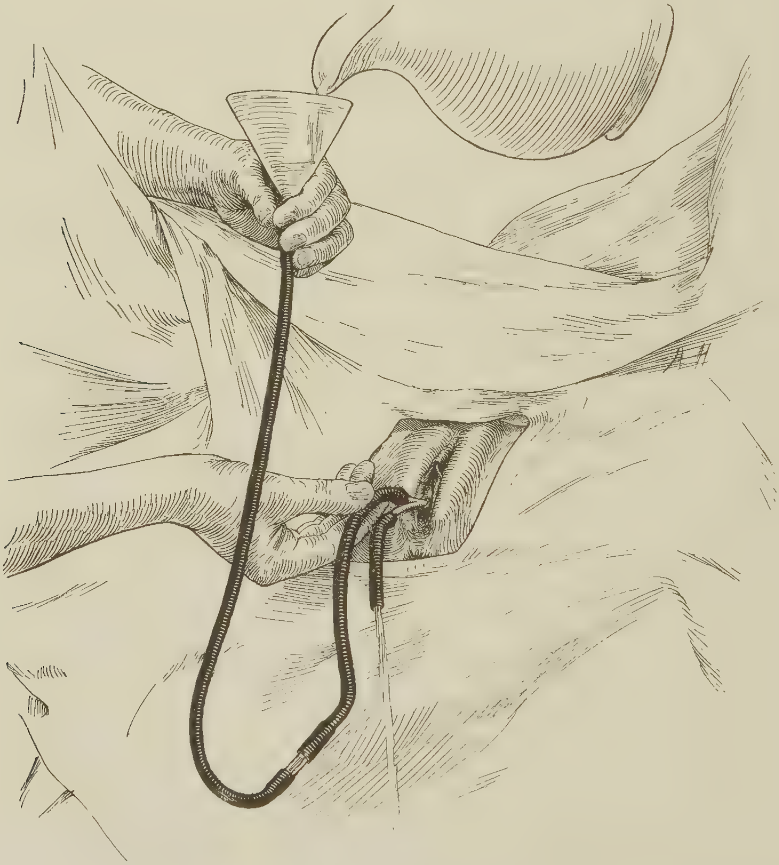

Fig. 156.—Showing How a Dickinson or any Two-way Catheter Can be Used in Irrigation of the Bladder.

Formula for solution of nitrate of silver 1:1500:

℞ Arg. nitrat. .... gr. $\frac{1}{3}$
Acidi borac. .... gr. vj
Aq. destil. .... f℥j
M. S. Inject warm into bladder.

A strong stock solution of boric acid may be made up and diluted as used. If these instillations do not give prompt relief, or for any reason are not well borne, irrigations may be used, the bladder being washed out with a half saturated warm solution of borax, or with a boracic acid solution as hot as can be borne, following this by an injection, through the irrigating funnel (see Fig. 156), of a nitrate of silver solution 1:1000 or stronger as the patient is able to bear it. In some cases the irrigations and instillations may be alternated with advantage. After a certain line of treatment has been carried out for two or three weeks, there is often a distinct gain in changing to another line of treatment for a time. It seems as though we catch the bladder by surprise, and are able to get a hold on the disease, which has become used to the first method of treatment.

(3) If a short course of treatment, such as that prescribed above, does not promptly relieve the cystitis, a specimen of urine should be taken by catheterization, five grains of chloral added to the ounce, and sent to the nearest laboratory for examination and report. I suggest this here for the convenience of practitioners who are at a reasonable distance from laboratory convenience but have not been accustomed to using them. It is really advisable, as a rule, to take this step at the outset, as it will save the occasional mistakes in treating tubercular cases which demand surgical treatment from the first, and are never much benefited by mild local measures. If, with rest, and drugs, and diet, and instillations, and irrigations, the cystitis holds on, showing no signs of marked improvement, the next step is

(4) Topical Treatments.—It is one of the healthy signs of the day that many general practitioners are closely enough in touch with the various specialties to perform certain minor surgical operations, to operate for an urgent appendicitis, and to apply treatments to the throat and nose, as well as to undertake a variety of lesser gynecological procedures. Such men, if familiar with the use of the head mirror, could also with a little pains distinguish inflammatory patches in the bladder through my open air cystoscope and apply topical treatments when the areas involved are not too large. To do this it is necessary to put the patient in the knee-breast position and to look into the bladder in the manner described in the section on examination of the bladder (p. 528). The bladder, expanded with air by posture, is emptied by suction, when the inflammatory areas are seen through a speculum two-fifths of an inch in diameter. It is equally easy to use an applicator and to touch the affected spots with a two to five per cent solution of silver nitrate. Such treatments may be applied every three to five days, irriga-

tions and mild instillations being used in the meantime. Any case which fails to improve rapidly ought not to be held onto indefinitely, but should be sent to a trustworthy urological specialist.

(5) Opsonic Treatment.—The profession looks with eager interest to-day towards the opsonins for relief from chronic infections. I do not know that this plan has as yet had any satisfactory trial in bladder disease. The proper course for opsonic treatment would be to make a culture from the patient's urine and to inoculate the organism causing the cystitis; then from this to make a vaccine of the dead organisms, which is injected as a toxine to inhibit the activity of the living germs in the vesical tissues by stimulating the production of antitoxines in the patient's body. These toxines for the various organisms can be secured to-day from several enterprising firms who can keep them in stock.

(6) Drainage of the Bladder by the Vagina.—This method of treatment belongs to the realm of the surgeon, and it is not my purpose to dwell upon the operation here, further than to indicate that the drainage may be quickly and efficiently made by putting the patient in the knee-breast posture and then opening the air-distended bladder through the vagina by pushing a knife through the septum in the middle line between the internal urethral orifice and the neck of the uterus. Such a drain should be kept open by sewing the vesical to the vaginal mucosa; unless this is done, the wound closes too rapidly to be of much service. When the simple drainage does not suffice, irrigations entering through the urethra and running out by the drainage opening may be kept up for from two to four hours each day (see Fig. 157); or the patient with the drain may be put into the tub for several hours each day. Under such treatment marked improvement usually takes place in the course of a few months. If after several months the bladder is cleared up to one or two red and bleeding areas the surgeon should then be sought to excise these by a suprapubic operation. By one or another of these methods practically all cases of cystitis, except tubercular cystitis in the last stages, are amenable to treatment. I know of no disease, however, which requires more constant exercise of good judgment in devising plans of treatment and in persisting in spite of many discouragements for sometimes as much as several years. Some of the best results I have ever seen have been gained by treatments extending over three or four years. In the end, however, the disease was cured, health restored, and the patient delivered from a distressing malady. The result in such a case makes all the labors trifling in comparison however onerous they may have seemed at the time. The following case illustrates how much may be accomplished by sustained effort in these cases.

Mrs. E. K. B., age thirty-nine, April, 1907 (San. No. 2440).

The patient's family history was good and menstruation had always been regular and painless. She had been married fifteen years, but had never had a child; she dated her trouble from marriage. About fourteen years before coming to me, she began to have a severe leucorrhea, and her physician, in order to cure this, put a stick of silver nitrate into the urethra, which caused sloughing of the entire mucous membrane. This caused her intense suffering for weeks and left her with a permanent incontinence. She was then examined by a distinguished Chicago surgeon, who told her that the sphincter had been entirely destroyed. She had had, in all, about eighteen operations to cure the incontinence, and finally had a spout-shaped urethra made for her. By putting a pledget of cotton underneath this, she obtained fair control over the bladder, nevertheless there was a considerable irritation in it as well as pain. The urine contained the colon bacillus and a few red blood cells. An examination of the bladder by the cystoscope showed a normally shaped bladder of normal capacity. The mucosa looked fairly normal, except for an ulcerated area on the posterior wall. This ulcerated area had been treated for months by one of my associates with local applications without relief. I opened the bladder suprapubically, examined its interior, and found that there was only one place of disease, namely, an ulcer on the posterior wall, which was three centimetres long and two wide. I excised this ulcer,

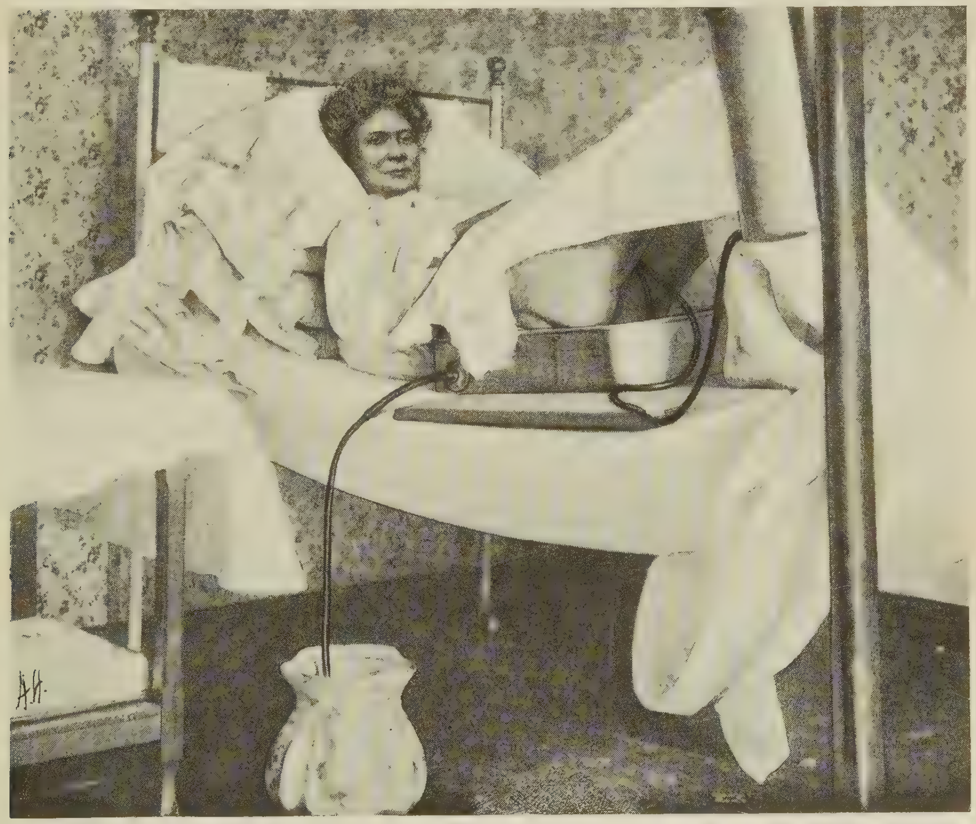

FIG. 157.—METHOD OF CONTINUOUS IRRIGATIONS OF THE BLADDER WITH THE PATIENT IN BED ON A BEDPAN.

sewed up the bladder wall with fine catgut, and also closed the suprapubic opening. To help the incontinence I used a paraffin injection under the urethra. The patient was discharged a month later feeling well, with perfect continence, and a normal looking bladder. This was one of those resistant cases which yield to nothing but a surgical operation.

A simple but valuable form of drainage which sometimes works admirably is effected by the insertion of a self-retaining catheter through the urethra. Some urethræ will tolerate this instrument quite well and for a long period of time. The catheter serves to keep the bladder emptied and at rest, while at the same time it affords a way of irrigating the bladder as often as may be necessary without the distress occasioned by catheterizing the patient every time. One of my cases did well in this way under a constant irrigation with a weak boric acid solution. This was affected by fastening two small rubber catheters together with rubber cement and introducing them into the bladder; they were held in place by a perineal pad fastened with a tape around the waist. The fluid ran in slowly through one catheter, circulated in the bladder, and escaped by the other. This avoided the making of a vesico-vaginal fistula.

CHAPTER XXIII.

FUNCTIONAL NERVOUS DISORDERS MET WITH BY THE GYNECOLOGIST.

Introduction, p. 541. Varieties of functional neuroses: Hysteria, p. 542. Neurasthenia, p. 543. Hypochondria, p. 544. Psychasthenia, p. 545. Diagnosis of functional neuroses, p. 548. Prognosis, p. 552. Treatment, p. 552.

INTRODUCTION.

Many patients who complain of symptoms referable to the genito-urinary organs, the lower abdomen, or the back, and who appeal to the gynecologist for aid, are, in reality, suffering from nervous disorders and require treatment directed toward the nervous system rather than local therapy. Unless the gynecologist is familiar with the general characteristics of the functional neuroses, he will often be led astray in diagnosis, and will be induced to institute local measures of treatment, which, by focussing the attention of the patient upon her symptoms, will lead to their perpetuation rather than to their amelioration. If, on the other hand, he has learned how to unmask the functional neurosis, and, having attained this point, to direct his treatment toward the general condition of the patient, he will often score successes quite impossible otherwise, he will enhance his own reputation, and increase greatly the value of his service in the community.

In the functional neuroses, the symptoms presented by the patient may resemble very closely those of organic disease. Frequent and painful micturition may excite suspicion of the existence of a urethritis or a cystitis. Pain in the back or in the legs may suggest some uterine displacement. Hyperesthesia in the ovarian region may make the gynecologist think of a serious ovarian disease; difficulty in walking may suggest disease in the sacro-iliac joints, or a sciatica; nervous disturbances of intestinal origin may cause fear of the existence of organic lesions in the large bowel or its neighborhood. Dysmenorrhea and headaches in the neurotic are often considered indications for dilatation and curettage. Such examples might be multiplied almost indefinitely, and every working gynecologist, who has had his eyes opened to the functional disturbances of the nervous system, is familiar with the manifold ways in which the symptoms may ape those presented in organic disease. It seems worth while, therefore, in a work on medical gynecology, to direct attention to some of the general characteristics of the functional neuroses; to discuss the diagnosis of these disorders at least briefly, paying special attention to the means of differentiating them from certain organic affections with which they may be confounded; and, also, finally to outline the modern mode of treatment directed toward the nervous system in general, rather than toward the local manifestations.

VARIETIES OF FUNCTIONAL NEUROSES.

There is still much discussion even among internists as to the proper classification of the abnormal neural and mental phenomena which we are considering. No two neurologists, perhaps, will agree entirely as to classification and terminology. The various functional neuroses seem to go over into each other, without very sharp limitation, and some writers suggest that we do away with the special terms, and group all these deviations from the normal under the general title of the psychoneuroses. Those who have had much experience, however, in the study of these disorders are able to recognize certain tolerably definite types, which recur over and over again, and for convenience of description and record it is desirable that to these types special names should be given. At least five such types are worthy of general recognition, namely, hysteria, neurasthenia, traumatic neurosis, hypochondria, and psychasthenia. For a full description of the phenomena in these various types, the special text-books of Neurology and Internal Medicine must be consulted. For the purpose of this volume, however, a few brief sentences of definition will suffice.

Hysteria, contrary to a widely prevailing opinion, is a relatively rare disease. Neurologists now understand by it a very definite type of nervous disorder, and eliminate from it many of the bizarre nervous symptoms which, to the uninitiated, imply manifestations of hysteria. The most striking feature of hysteria is the extraordinary susceptibility of the patient to suggestion. The disease is in reality a mental disease, and should be so regarded, especially in treatment. The symptoms which the patients present are both bodily and mental, but the mental symptoms predominate, and are by far the most important to understand. It is common to divide the symptoms of hysteria into two great groups, the so-called stigmata, and the so-called accidents of hysteria.

By the stigmata of hysteria are meant the phenomena of the disease which tend to be permanent. These include the hysterical anesthesias, the hysterical amnesias, the hysterical aboulias, and the hysterical alterations of character.

By the accidents of hysteria are meant the more transitory and episodal phenomena of the disorder. Under this heading of accidents are included the convulsive crises, the paralyses, the contractures, the somnambulisms, and the deliria which may occur.

These various disturbances of function met with in hysteria appear to be due to abnormal ideas in the minds of the patients. It is not to be understood, however, that the symptoms are not real; nothing can possibly be more real to a patient than the symptoms of hysteria. The remarkable fact about the symptoms is that they can be produced by suggestion, and that they are curable by persuasion (pithiatic phenomena in the sense of Babinski).

Neurasthenia is a much more common affection than hysteria, and a large number of patients who suffer from true organic disease become neurasthenic later on as a result of the strain upon the nervous system, due to the organic affection. Still many of the cases develop in the absence of a demonstrable organic disease, owing to an improper mode of life or to mental or physical overexertion; they may also arise from faulty nutrition, or from the effects of some nervous shock, or prolonged nervous strain. In this disease, often designated as "irritable weakness," the patients are frequently more excitable than normal, but are incapable of enduring activity, owing to the tire which results from the exercise of almost any function. The symptoms in neurasthenia are both psychic and somatic. They vary greatly, but certain of them recur so frequently that they deserve special mention. Perhaps the most constant symptomatic feature in neurasthenia is fatigability. The patients complain that they can do nothing without an excessive feeling of fatigue; if they walk, if they read, if they try to follow their ordinary occupation, they are soon forced to desist by an overwhelming feeling of exhaustion. Associated with these symptoms of fatigue, headache or a sense of pressure in the head, pains in the back, and sleeplessness are frequently complained of. It is not surprising that patients with these symptoms should become mentally depressed, and the mental state is often clearly recognizable in the facial expression.

Neurasthenic patients very frequently complain of disturbances of the digestive apparatus, circulatory apparatus, and the genito-urinary apparatus. The symptoms may be referred to one of these systems alone, or to two or more of them simultaneously.

Among the disturbances of the digestive apparatus most frequently complained of are the various forms of indigestion; the neurasthenic finds that she is upset by certain kinds of food; she may complain of a heavy feeling, of soreness in the region of the stomach; she suffers from gaseous eructations, and from distention of the abdomen with gas; sometimes she is nauseated, and occasionally asserts that the eating of certain articles of food is invariably followed by vomiting or regurgitation; she is sure that she has an idiosyncrasy for milk, or for vegetables, or for some one of the varieties of food which enter into the daily diet of the normal individual. Constipation is very frequent, and many of these patients resort constantly to laxatives, purgatives, or enemata for relief. More rarely a troublesome diarrhea is complained of.

Among the circulatory symptoms presented by neurotic patients may be mentioned the subjective palpitation, pain or anxiety in the precordial region, with throbbing of the abdominal aorta, and of the peripheral arteries. Beating in the head is a symptom which is often very troublesome.

Of the genito-urinary disturbances met with among neurasthenics, frequent or painful micturition, imperative micturition, and nocturnal micturition, fluttering feelings in the region of the bladder, anomalies of the menstrual flow (quantity, quality, pain), disturbances of sexual desire and sense, and the like, are not unusual.

In searching for the etiology in these neurasthenic cases, the physician who knows how to ferret it out will be surprised to find how often the cause lies in some ethical or social relation which has been responsible for a great nervous shock or strain. This fact cannot be too carefully borne in mind, inasmuch as treatment will often prove unavailing while the cause is permitted to persist. Another fact which the medical practitioner should never forget in connection with neurotic patients is, that a neurasthenia producing symptoms referable to the genito-urinary, the circulatory, or the digestive apparatus may be due to the existence of some obscure organic disease in some other part of the body, far removed perhaps from those parts to which the symptoms most complained of are referred. A beginning apical tuberculosis, a slowly developing brain tumor, an uncorrected anomaly of refraction, a persisting sinusitis, an over-function of the thyroid gland, a hypertrophic osteo-arthritis of the spine, or a flat-foot may be the organic basis of nervous symptoms which give no clue as to their origin. In no part of medicine, therefore, is it more necessary to make a thorough systematic routine examination of the whole body than in patients coming to us with neurasthenic symptoms.

The condition known as traumatic neurosis is perhaps not so often confused with gynecological diseases as some of the other functional neuroses. After railroad accidents or other traumatisms, however, patients may develop symptoms, the result of the nervous shock, which so closely resemble disorders belonging to gynecology that they appeal to that quarter for aid. When a thorough gynecological examination reveals the absence of local disease, sufficient to account for the symptoms complained of, the gynecologist will do well to seek for psychic or physical trauma which might give rise to a so-called traumatic neurosis.

Hypochondria is much more commonly met with in men than in women, but it does occur in the latter, and the gynecologist should be familiar with the symptoms which hypochondriacal patients complain of. In this disorder it is the nosophobia or fear of disease which is especially characteristic. Our bodily organs are supplied with sensory nerve fibres along which impulses are carried centripetally to the brain. In normal life these impulses, though of the greatest importance for the coördination of the activities of the body and for the maintenance of normal conditions in the vegetative and psychic life of the individual, go on below the threshold of consciousness; we are totally unaware of them. In hypochondriacal conditions these centripetal impulses no longer remain subconscious; the patient begins to feel abnormal sensations in various parts of her body and attempts to interpret them. Her general sense of life and her general bodily consciousness are different from what they were before. She complains of feeling badly and describes vague distressing sensations which keep her in a constant state of discomfort; her mood alters and she may become very much depressed, fearing the existence of serious disease in some one of her organs. It is often very difficult to convince the hypochondriacal patient of the non-existence of demonstrable organic disease. The abnormal sensations and the continual discomfort are such real things in the psychic life of the patient that any amount of argumentation on the part of the physician frequently fails to allay the patient's fears.

Psychasthenia.—A mental disorder which is extremely common, but which has only of late been adequately recognized, is the condition which is now designated as psychasthenia. In some one of its manifestations it is perhaps the commonest functional nervous disorder which the gynecologist will meet with. Any physician who sees a large number of patients each day is sure to have among them several who present psychasthenic phenomena. The psychasthenic state was formerly confused with hysteria on the one hand, and with neurasthenia on the other, but since the very careful investigations of Pierre Janet, of Paris, medical men have been taught how to differentiate this state from the others to which it is more or less closely allied. The severer forms of the affection have been well described by C. L. Dana, of New York, under the term phrenasthenia, and English writers, notably Hack Tuke and Mickle, have written of several varieties of the disease under the captions of "imperative ideas" and "mental besetments." In this country a large number of psychasthenic states have been included in descriptions of neurasthenia; thus, for example, the various phobias described by Beard are now separated from neurasthenia proper, and classified under the heading of psychasthenia. Too much stress, however, must not be laid upon classification. It is perhaps impossible to draw a distinct line between psychasthenia in its milder forms, and some of the neurasthenic states, and even hypochondria is regarded by some as a mental state which may occur either in neurasthenia or psychasthenia, or in the early stages of the more outspoken psychoses.

A careful study of Janet's book, entitled "Les Obsessions et la Psychasthenie," Paris, 1903, can be heartily recommended to any one who desires to familiarize himself with the main features of this remarkable disorder. Psychasthenic patients suffer almost constantly with the sense of incompleteness or of insufficiency, from disturbances of the feelings of reality, and from other symptoms referable to the lowering of the so-called psychological tension. It is probably owing to these fundamental disturbances that the other phenomena, which are clinically, perhaps, more characteristic of the malady, develop, namely, the obsessions, the pseudo-hallucinations, the impulses, the mental manias, the tics, the forced agitations, the fears, the anxiety conditions, the sense of strangeness and unreality, the phenomena of depersonalization, and the like.

The imperative ideas or obsessions presented by psychasthenic patients differ much in content; the idea has a permanence, entirely out of accord with its importance and its practical utility; it comes up into the head of the patient over and over again in spite of herself, and do what she will, she cannot rid herself of it. Sometimes it is an idea of sacrilege, sometimes an idea of crime, sometimes an idea of shame regarding herself or her body, or, perhaps, an idea of incurable disease. Every gynecologist is familiar with the patient who, in spite of repeated assurances to the contrary, is convinced that she has some serious disorder of her ovary, of her uterus, of her bladder, or of her kidney; the whole intellectual interest of the patient centres in her health, or in the disorder of that health which she assumes does exist. Very frequently some painful thought is associated with some normal process in the body; indescribable anxiety is associated with the function of micturition, or of defecation, for example. Other patients have a sense of shame connected with their bodily appearance; they are too fat, or they are imperfectly developed in some part, or they complain of some peculiar movement of the body, or of abnormal blushing, or of persistent pimples, or of abdominal distention. The most bizarre idea may become focal in consciousness, and despite the greatest effort to become marginal, remain focal. It is curious that most of these fixed ideas are associated in a certain degree with self-accusation. Indeed it is the scrupulosity of the psychasthenic patient which often characterizes her especially.

When the patients complain of abnormal impulses, the impulses are nearly always directed to the performance of some evil deed, and the acts which they think themselves forced to perform are extreme in nature; the patients describe them as most sacrilegious, most criminal, most dangerous, or most odious. As a matter of fact they rarely yield to the impulses which they say dominate them.

These imperative ideas and impulses are present in the most outspoken cases of psychasthenia. It is the less outspoken cases, with milder symptoms, which are more likely to be met with by the gynecologist, and which, at first, may puzzle him.

The feelings of insufficiency and incompleteness characteristic of the milder psychasthenic states are those most important to recognize; too little attention is paid to them, because they are feelings to which even the normal mind is occasionally subject. The incompleteness described by the patient may refer to her actions, to her intellectual processes, to her emotions, or to her personality. A woman presenting gynecological symptoms may in parenthesis tell us that she has noted an increasing difficulty in action, or that she feels that all effort is useless, or that she is no longer a capable woman, that she is troubled about making up her mind about things, that she is doubtful or hesitates before doing things, that she is discontented with life, that she suffers from being over-humble, or that she is in a state of revolt or resentment regarding conditions in which she finds herself placed. Other women complain that they have noticed a growing indifference to things in which they were formerly interested, and in which they know they should still have a lively interest. A persistent sense of boredom is not an infrequent complaint in the gynecological consultation room. Other patients suffer from an indefinable anxiety or disquiet; women frequently say that, in order to relieve their minds of their local troubles, they are compelled to resort to various diversions or exciting occupations.

Besides these subjective complaints which the women themselves report, their husbands or friends may also describe to the physician observations which they have made, and which are quite in accord with the subjective complaints of these patients. The daily observation of the husband, if he have his eyes open to these modifications of psychic function, may have put in evidence certain disturbances of the will, of the intellect, or the emotions of his wife; he may have noticed a growing indolence, an increasing lack of resolution, a corresponding feebleness of effort, the quick development of fatigue on exertion, a dislike for new surroundings or occupation, a preternatural social timidity, an abnormal inertia, or even outspoken crises of exhaustion; or he may have noticed that his wife has gradually become more forgetful, or that the memory is slower than it formerly was, or that she pays less attention to what is said to her, often appearing *distrait* and wrapped in revery. On the emotional side, he may have observed a real indifference which is unnatural, an increasing depression of spirits sometimes reaching actual melancholy, an exaggerated emotional reaction to the ordinary occurrences of life, a desire of being controlled, or an abnormal desire to control others; an inordinate craving for affection, or for the expression of her own affection.

One of the most characteristic disturbances to which these psychasthenic women are subject concerns the so-called sense of reality. In the first clinical conversation with such a patient she may volunteer the statement that things seem unnatural to her, that everything looks hazy, or as though a veil were drawn between her and the external objects. In other patients, while things outside themselves appear natural to them, a feeling of some change in their own bodies is complained of; they realize that they are different from what they formerly were; they state that they are only half alive, or that they feel as though they were dead or dying, or as though the mind were separate from the body. Examples such as these will enable the physician to recognize other similar complaints which belong in the same category.

A word as to some of the forms of mental manias presented by the more severe types of psychasthenic patients may here be in place. Some of these patients are tormented by an eternal questioning concerning the nature of things, or concerning anything which they happen to think about; or they have manias of hesitation or deliberation; in others the need of precision is overwhelming; if any little thing is out of place in their houses, they suffer intensely, and make others suffer for it. Others have troubles in the use of certain numbers, especially the number seven or the number thirteen; still others cannot pass certain objects without touching them; some are compelled always to pay attention to a whole series of precautions before undertaking anything, and some state that they are continually besieged with premonitions of impending occurrences.

Among the emotional agitations presented by the psychasthenic patients, various sorts are common: fear of disease, fear of going insane, fear of places, fear of animals, fear of people, fear of anything.

It is to be remembered, in psychasthenia especially, that the symptoms tend to be periodic in course. A psychasthenic woman has, in the majority of instances, inherited a pathological nervous system, so that anything which lowers the general vitality will tend to give rise to a psychasthenic state, and this state will persist until the general health is again improved enough to raise the level of psychasthenic tension sufficiently high to overcome the symptoms. It is not at all uncommon in such patients to find that they have suffered similarly for shorter or longer periods several times before, at intervals of months or years. Some see in this the possible relation of psychasthenic states to the more severe psychoses of well-known circular type. However this may be, the periodicity of psychasthenic manifestations is a fact which should always be kept in mind in connection with diagnosis and prognosis.

In addition to the various types of functional disorder which are more or less characteristic, and which have been briefly described above, the gynecologist will often meet with slight nervous manifestations which he may find difficult to classify. Some of his patients, for instance, may complain of a tendency to hurry, to worry, or to be abnormally irritable; others will ask for relief from a morbid self-consciousness, or an abnormal personal sensitiveness, or an indefinable state of apprehension; the husband, in turn, may confidentially appeal to the physician to notice a habit of contradiction in his wife, or a resentful disposition.

In such cases, the physician will do well to be on his guard, and seek for other less manifest abnormal neural symptoms; here a thorough psychic inquiry is important, and the more the gynecologist trains himself in the technic of psychic methods of inquiry, the greater will be his success in the management of such cases.

DIAGNOSIS OF THE FUNCTIONAL NEUROSES.

Mistakes are perhaps more frequently made in connection with the diagnosis of the functional neuroses than in any other part of medicine. In thousands of women the diagnosis is undoubtedly entirely overlooked, and these patients are transferred from specialist to specialist, who treat their reflexes and sometimes do more harm than good by concentrating the attention of the patient upon her symptoms by making local applications. On the other hand, those who are impressed with the importance of the psychic and nervous symptoms, unless they are very careful in the exclusion of organic disease, may, through their efforts to treat the general condition, overlook an important local cause which has been responsible for the origin of the nervous symptoms, and which will cause them to persist until it is removed. It is, therefore, desirable that the gynecologist, the general internist, and the neurologist should coöperate in the study of cases which present a combination of gynecological complaints with general nervous manifestations. If, on the one hand, the internist would consult the gynecologist more frequently, in order that he may be sure of the presence or absence of a gynecological lesion; and if, on the other hand, the gynecologist would refer more of his patients to the neurologist and the general internist for a thorough systematic study and report, fewer mistakes would be made. The great difficulty of the internist is to find a gynecologist to whom he can refer patients for examination, who will not be too much impressed with slight local gynecological lesions, and who will be broad-minded enough to understand that not every gynecological disturbance in a patient presenting general nervous symptoms deserves radical local treatment; and the difficulty of the gynecologist, in his turn, is to find a neurologist or an internist whom he can trust to pass judgment upon the relative importance of the general manifestations presented by patients who have applied to the gynecologist for aid. Nevertheless, it is only through the hearty coöperation of the internist and the various specialists that the highest success can be obtained in the treatment of patients, and every physician who, by his broadness and soundness of judgment, contributes to the growth of mutual confidence among medical practitioners in this respect will be of great service in the community in which he lives.

It will be obvious from what has been said above in regard to the symptomatology, that it is the consideration of the woman as a whole which is all important in these cases. A narrow specialization is disastrous, and yet the general examination must avail itself of the most modern refinements of diagnosis in all the special branches. Every practitioner then should arrange some coöperative organization by means of which he will be able to provide himself with all the data necessary for the exclusion of organic disease, and the determination of the exact degree and significance of existing organic disease in all parts of the body.

A careful consideration of the individual symptoms presented, and the grouping of these symptoms, will permit a decision as to the particular form of nervous or mental malady with which one is dealing. The most important clues to the three main types of functional disorder are as follows: For hysteria, the suggestibility; for neurasthenia, the fatigability; and for psychasthenia, the sense of incompleteness and insufficiency, the indecision, the interrogations, the doubts, and the fears.

There are certain forms of organic disease that present symptoms which practitioners too often regard as entirely functional in origin. It will be desirable to refer to some of these in detail, bearing in mind, of course, the special needs of the gynecological practitioner.

A beginning tabes, though less common in women than in men, may give rise to local symptoms whose significance the physician may underestimate. A difficulty in passing urine, a complaint of rectal, vaginal, or vesical pain, especially if it occur in the form of paroxysmal attacks or crises, a marked change in the sexual desire or sense, should make one suspicious of the existence of degeneration of the posterior funiculi of the spinal cord, and should lead one to make at least an examination of the state of the general bodily sensation and the reflexes, especially the pupillary and patellar reactions. Should any anomaly be found, the patient should be subjected to a thorough routine neurological study, to determine the presence or absence of a latent locomotor ataxia.

More rarely, lesions of the cauda equina or conus medullaris may give rise to genito-urinary or rectal symptoms with which the gynecologist must be familiar. An incontinence of urine or feces, or an anesthesia in the region of the vulva or mons veneris, should put the physician on his guard and make him test the Achilles reflex as well as search for other evidences of organic change in the lower part of the spinal cord or spinal canal.

An osteo-arthritis of the lower portion of the vertebral column, or the sacrum, or of the sacro-iliac joints may give rise to symptoms which lead the patient to the gynecologist. Pain in the small of the back, or in the sacrum, or sacro-iliac organs, or down the backs of the thighs and legs may be associated with disturbances of locomotion and with anomalies of position of the spine or pelvis. Here a careful physical examination, associated with an X-ray photograph of the lower vertebral column and of the sacro-iliac joints should clear up the diagnosis.

Another disorder to which attention has recently been drawn, especially by the orthopedic surgeon, Goldthwait, of Boston, is the relaxation of the sacro-iliac joints which so frequently occurs in women, especially at middle life, and in those who are overnourished, or who, for one reason or another, have been compelled to remain in bed for a considerable period of time (repeated pregnancies, gynecological operations, rest cures, etc.). By means of the so-called sacro-iliac test, the attitude assumed, the history of the case, and the exclusion of other diseases, the gynecologist should learn to recognize these cases and refer them to the orthopedist for mechanical treatment (see Chap. IX).

Mucous colitis is a manifestation too often maltreated by the gynecologist and by the gastro-enterological practitioner. Sometimes a mucous colitis is undoubtedly due to irritation from a misplaced uterus, or perhaps to reflex irritation, but in the majority of cases it should be looked upon as a nervous disease and treated by measures directed toward the improvement of the general health rather than by local applications. It is not uncommon to see cases treated for months and years by intestinal lavage, oil enemata, astringents, or other local measures with progressive deterioration of the patient. In most of these cases the complete cessation of local treatment is advisable, and the patient, if put to bed, isolated from her friends, overfed, and suitably encouraged, will get well.

A word should perhaps be said with regard to the danger of confusing the symptoms of an early multiple sclerosis with hysteria or with other functional neurological manifestations. This is a mistake which the best neurologists dread, and where there is the least doubt, a complete routine neurological investigation should be resorted to before drawing the final inferences regarding the diagnosis. Of course, in the outspoken cases with scanning speech, nystagmus, intention tremor, and pallor of the optic papillæ, there can be no doubt, but in cases in which the classical symptoms are not in evidence, there is great danger of overlooking this serious condition.

Hyperthyroidism is a condition often associated with nervous disturbances; it is far more common than is realized by the average family practitioner. Not infrequently it accompanies diseases of the genito-urinary organs, and when it does so, it may in reality be responsible for the symptoms which the patient presents, rather than the local gynecological lesion which has been recognized, and for the treatment of which the patient has come to the physician. Periuterine inflammation has long been known to be frequently associated with symptoms of hyperthyroidism, and Freund's report on the subject is an admirable statement of the facts. As Albert Kocher has pointed out, too, a diminution of the menstrual flow is very common in patients suffering even from the milder forms of Graves' disease. In a patient presenting obscure nervous symptoms, especially one complaining of apprehension and indefinable anxiety without apparent cause, the physician should make the tests necessary to determine whether or not a hyperthyreosis exists; if a tachycardia (or better pycnocardia) exist continually; if there be a struma, especially if it be vascular in nature, pulsating visibly, and giving a thrill to the palpating finger, and especially if *bruits* are audible over the point of entrance of the thyroid arteries into the thyroid gland, the diagnosis may be regarded as certain, and the patient should be referred to a surgeon skilled in the technic of partial thyroid extirpation and arterial ligature. Rapid tremor of the fingers in this disease is exceedingly characteristic, and is a test which can be applied in a moment, often pointing the way to the diagnosis. A familiarity with some of the eye-signs in patients with hyperthyroidism is also a great help, and often keeps the physician from overlooking the affection. By asking the patient to follow the finger as it is gradually moved downward, it is possible to make out whether or not the eyeball runs ahead of the eyelid, so that the white sclera shows between the cornea and the upper lid (von Graefe's sign). Or, if the patient is asked to look at the ceiling, and then at the end of her nose, he can determine whether or not there is tendency to inability to maintain the condition of convergence (Möbius's sign). Or, he may notice whether or not the visual aperture is much widened, and if involuntary winking be lessened or incomplete (von Stellwag's sign). Of course, when there is exophthalmos it is the most striking and characteristic sign and recognizable even by the laity, but it should not be forgotten that marked protrusion of the eyeballs is absent in perhaps two-thirds of the cases of hyperthyroidism.

PROGNOSIS.

The patients and the patients' friends are always anxious to know whether or not the condition they come to be treated for is curable, and here long experience in dealing with the functional neuroses is necessary before that matured power of judgment can be gained which will permit the physician to speak to the patient with anything like accuracy as to the outcome which may be expected. With the modern studies of the psychoneuroses, new hope can be held out to these patients. Many women who formerly would have been doomed to a lifetime of incapacity and non-productiveness can now be restored to very good health and be made useful members of the community.

In the treatment of the milder forms of hysteria and psychasthenia, and especially in the treatment of neurasthenia, in all forms except those in which there is a pronounced hereditary taint, the results are very gratifying. In the graver forms of hysteria, in the severer forms of psychasthenia, and in outspoken cases of hypochondriasis, we have to deal with mental disorders which often tax all the resources of the physician, and which sometimes the best-directed efforts known to modern neurology and psychiatry fail to cure. In nearly all cases, however, even the most severe, it is possible to get great relief, provided the psychic factor is clearly recognized, and the proper methods of treatment, especially the resources of psychotherapy, are applied.

TREATMENT.

For a full discussion of the treatment of these disorders works upon Neurology, Psychiatry, and Internal Medicine must be consulted, but the general principles will be briefly referred to here.

In the first place it cannot be too strongly emphasized that any routine treatment of these cases is likely to be harmful. In no part of medicine is a definite individualization of the therapy more necessary. Great harm is done in the routine application of the so-called "rest cure," and rather than recommending a systematic routine it would be nearer the truth to state that no two nervous patients need the same treatment.

Preceding all treatment there should be established, as has already been said, a very exact anatomical, functional, and etiological diagnosis, and the diagnostic study should have been extended to all parts of the body of the patient. Only by strict adherence to this rule can serious mistakes be avoided, and medicine kept from the pitfalls which beset the work of quacks and irregular healers.

Having formed a judgment as to the actual condition which exists, the patient should be frankly told the results of the study and the opinions of the physician as to the nature of her disease, and the rationale of the treatment to be followed.

If a cause of the disorder has been made out and found to be still persisting, the first indication in treatment is, of course, its removal, and the physician who bears this fact in mind will be very much surprised to find how often by a change of environment, or by intervention in some social relation, the whole clinical picture can be speedily altered. Again, if some organic disease be found to exist, and the physician conscientiously feels convinced that it is responsible for the nervous symptoms, treatment should be directed toward this, either at once or after such preliminary preparation as seems necessary. An incipient tuberculosis, an osteo-arthritis, an eye-muscle anomaly, a displaced uterus, bleeding hemorrhoids, or a gonococcal trigonitis will receive its appropriate attention, and after its indications have been met, the health of the patient can be built up by general reconstructive measures, and then the nervous symptoms may be expected to disappear.

In cases in which the condition is predominantly a psychoneurosis, the gynecologist may undertake the treatment himself if he is interested in this work and has the facilities for caring for psychoneurotic patients; or he may refer the patient to an internist or neurologist who devotes his attention especially to such treatment.

The best means of combating the psychoneuroses known to medical men at present, consist in rest, isolation, the improvement of nutrition, and psychotherapy. In addition to these main therapeutic instruments, certain adjuvant measures are more or less helpful, such as the use of electricity, drugs, etc., especially in combating some of the symptoms.

Rest may be prescribed in various ways, though usually physicians apply the well-known " rest cure " of Weir Mitchell. When this treatment is adopted, it is common to keep the patient on her back in bed completely at rest, physically and mentally, for a period of from four to six weeks, after which she is gradually permitted to return to various physical and mental activities. A prolonged rest of this sort is especially helpful in cases of neurasthenia and in psychasthenic states, associated with emaciation. The most brilliant results are obtained in the patients who have suffered from nervous disturbances of digestion and who have reduced their diet gradually until they have gotten into a state in which they are eating far less than is required to nourish them. Many of these patients have had the erroneous idea that they should exercise more as their emaciation progressed; some one has told them to keep up strenuous physical exercise, and not a few of them who apply for treatment will be found to be following daily some rigidly prescribed system of gymnastics, despite the miserable state of their nutrition. It is very important to remember, however, that not every nervous patient needs rest in bed. Some patients do badly in bed, and much experience and medical tact is necessary to decide when this treatment should be tried and when it should be avoided. Some of the severer psychasthenic cases especially do badly in bed, and though in the treatment of the obese nervous patient a short stay in bed may be desirable at the beginning of the treatment, any prolonged sojourn in the recumbent position is harmful for her.

In all the severer forms of the psychoneuroses (but of course not in the milder forms of the disease) isolation of the patient is absolutely necessary if the best results are to be obtained. This is one of the most important features of the cure as it was carried out by Weir Mitchell, and it is a feature which unfortunately has been honored more in the breach than in the observance by those who have attempted to imitate Mitchell in his management of nervous patients. It is not always easy to get the consent of patients to submit themselves to complete isolation from family and friends. Even when the patient and her friends consent to isolation, too frequently the physician and the nurse do not maintain her in the necessary degree of separation. For instance, many medical men have made the error of attempting to isolate nervous women in bedrooms in their own houses. This is almost invariably unsuccessful, and it is, as a rule, better not to make any pretence of isolation at all, than to try to carry it out in this ineffectual way. The patient and her friends mean to observe isolation when they promise to do so in the patient's own house, but they almost always find it impossible to adhere to the rules. It is, therefore, very desirable when isolation is practised, to remove the patient to an institution (sanitarium, hospital, or private house specially arranged for the purpose) in which she will see no one except her physician and nurses, and in which she will not come in contact even with servants who have attended to her before. In arranging for the isolation it is necessary to tell the patient that during her stay she will not be permitted to have any communication whatever, either verbal or written, with her family or friends, except by special permission. It should be said to her, however, that in case anything happens at home which she really should know about, she will be told; hearing nothing is to mean to her that everything is going well, and that there is no reason for her to worry about home conditions. When the importance of isolation is fully recognized by the physician and all these details are explained and impressed upon the patient, she and her friends will usually consent to it, and a great step forward has been taken toward getting the patient well. Here again individualization is necessary, and the physician will after a while acquire the experience which will permit him to decide which patient ought to be isolated and which should not be.

During the period of complete rest and isolation, it is important, in order, in the first place, that a strict *régime* may be closely followed, and in the second place that the patient may not be too lonesome, that she shall have the care of a special nurse who devotes herself entirely to her. The expense of this is, of course, prohibitive in many cases, and then one has to make compromises corresponding to the particular conditions. Many cases do very well with the ordinary ward nurses in hospitals and sanitaria.

The diet of the patient should be, of course, carefully looked after; a very large proportion of nervous people complain of disturbances of digestion, and a great many prejudices have to be overcome at the beginning of the treatment. In the majority of instances this is best accomplished by taking a firm stand with regard to the administration of milk in small quantities every two hours during the first few days of the treatment. Many patients will assert that it is absolutely impossible for them to take milk, and the physician in these cases usually does well to make a firm statement to the patient that in the early stage of the treatment she will receive nothing but milk. She should be assured at the same time that given in the way in which it will be ordered for her, she will suffer little or no inconvenience from it and be able to digest it satisfactorily. It is well to tell her that in case she seems to suffer from the first feeding or two, she is to pay no attention to the symptoms, but to take the ration of milk when it comes with the same conscientiousness as she would a dose of medicine. Even when the patient vomits the first feeding or so, I have always found that in functional cases, by persisting with a small quantity every two hours, all difficulty is soon overcome. As to the exact times of giving the milk, I have found the routine administration recommended by Dubois in his book entitled "The Psychical Treatment of Nervous Disorders," to yield very satisfactory results. In the wards of the Johns Hopkins Hospital the food-administration at the beginning of treatment is as follows:

	Hours of Day.								In twenty-four Hours.
	7 A.M.	9 A.M.	11 A.M.	1 P.M.	3 P.M.	5 P.M.	7 P.M.	9 P.M.	
First day	3	3	3	3	3	3	3	3	24 ounces.
Second day	4½	4½	4½	4½	4½	4½	4½	4½	36 ounces.
Third day	6	6	6	6	6	6	6	6	48 ounces.
Fourth day	9	6	6	9	6	6	9	6	57 ounces.
Fifth day	12	6	6	9	6	6	9	6	60 ounces.
Sixth day	12	6	6	9	6	6	9	6	60 ounces.

On the sixth day add bread, butter, sweets or honey at the first meal, with the twelve ounces of milk.

On the seventh day the regimen changes abruptly, and without transition the patient will take:

Breakfast.—Twelve ounces of milk, bread, butter, honey, or preserves.

At ten o'clock in the morning, eight ounces of milk.

Lunch (or dinner).—A full meal without permitting any choice. This should be varied and copious, but without wine.

At four o'clock take eight ounces of milk.

Dinner (or supper).—Should be equally copious.

At nine o'clock eight ounces of milk should be taken.

As soon as solid food is given the patient is advised to masticate thoroughly, adopting this feature of the so-called Fletcher system:

"When eating chew very thoroughly everything that is taken into the mouth (except water, which has no taste) until it is not only liquefied and made neutral or alkaline by saliva, but until the reduced substance all settles back in the folds at the back of the mouth and excites the swallowing impulse into a strong inclination to swallow; then swallow what has collected and has excited the impulse, and continue to chew at the remainder, liquid though it be, until the last morsel disappears in response to the swallowing impulse. Never forcibly swallow anything that the instincts connected with the mouth show any disposition to reject. It is safer to get rid of it beforehand than to risk putting it into the stomach."

No one measure has been more successful in my hands than the adoption of this dietetic *régime*, and nurses and house officers who have followed the cases in the medical wards are one and all enthusiastic about it.

While one need not fear the administration of large quantities of protein to patients who are nervously below par, it is perhaps well to give this protein largely in the form of milk and eggs, rather than in the form of meat; some meat should be given, but certainly not more than one or two portions per day. Whether or not it is the proteins of the meat themselves or the extractives associated with the proteins which are harmful to some people, we do not yet know. Most nervous patients appear to do better when the meat is not pushed too much.

Where constipation exists, the diet should contain liberal quantities of stewed fruits and vegetables (especially carrots and spinach), and the patient should be advised to eat half a pound of Graham bread per day. This dietary, together with a teaspoonful of lime juice in a glass of water at 6.30 A.M., will often overcome the difficulty of constipation. Whether she has the inclination thereto or not, each patient should try to have a movement exactly one hour after the beginning of her breakfast each morning; a regular habit is in this way soon formed. Until the habit is established, the patient is permitted an enema each third day, in case no natural movement occurs. In a few instances one is obliged to give cascara or some other mild laxative for a time, but the physician who is conscientious in the treatment of constipation without drugs will succeed more often than he who resorts to drugs in every case.

When the patient is resting in bed, it is well to keep her flat on her back with only one pillow, for several weeks. It is customary to give a cold sponge at 55° to 60° F., followed by an alcohol rub each morning; some hydrotherapeutic measure in the evening is often of advantage. Where there is insomnia especially, the cold pack will frequently give the patient a good night's rest. It is rarely necessary to use hypnotics, and I am convinced that one of the commonest mistakes made in the treatment of nervous patients is the too frequent resort to trional, sulphonal, veronal, and other sleep-inducing drugs; a single dose or two at the beginning of the treatment may perhaps be permitted, but it is interesting to find how often insomnia can be gotten rid of without the use of any drug whatever. In my experience, the majority of cases of insomnia yield without any use of pharmacotherapy. A cold pack at night, while useful in many cases of insomnia and especially in phlegmatic or apathetic patients, may be actually harmful in a very irritable or hyperesthetic woman. In its place a warm pack or a prolonged warm bath may yield better results.

During the period of complete rest, the patient does not sit up at all except on going to stool, or when propped up in bed with pillows, for her meals. Where it is possible to run the patient's bed out-of-doors in the daytime, it is very desirable to do so; even in the coldest winter weather these nervous patients do well out-of-doors. They must, of course, be kept warm; if necessary with the use of Jaeger underwear, blankets underneath as well as above the patient, hot-water bottles, and a woolen cap for the head. Patients may sleep out-of-doors at night, or if they sleep in bedrooms, they should have all the windows of their room widely open.

At the end of the period of rest, usually at the end of about five weeks, the patient begins to sit up; during the first day she is given a back rest for one hour, and this is increased to two hours on the next day. On the third and fourth day she is permitted to sit in a wheel-chair for an hour, and the time is gradually increased during the next few days. On the eighth day a walk of ten minutes is allowed, and if all goes well, the walk is increased until at the end of a fortnight, or even less, the patient may walk five miles a day without special fatigue. If much weight has been put on, care must be taken that the arches of the feet do not yield to strain at this time, and if pain is complained of on walking, suitable orthopedic shoes, or even temporary supporting plates for the feet, may be required. When the patient begins to be up and about she is allowed a quick morning plunge in water at the tap temperature, and this replaces the cold sponge of the resting period. Setting-up exercises and calisthenics are often advantageous during the after-cure, and mild forms of occupation, sewing, knitting, crochet work, and the like, are helpful.

Early in the cure, even when the patient is at complete physical rest, the nurse is instructed to read aloud for periods of increasing length during the day, and later on, the patient may be permitted to read herself under supervision as to time and subject, being thus gradually led back to normal life and intercourse.

Special dietetic measures are necessary where there is a tendency to obesity, to diabetes, or to gout, the details of which cannot be considered here. In patients suffering from hyperthyroidism, the protein portion of the diet should consist almost wholly of milk, inasmuch as meat seems to stimulate the activity of the thyroid gland.

Massage is an important aid in the administration of the rest cure, especially in that it makes the patient more comfortable in bed. There is a mistaken idea abroad that it takes the place of exercise by influencing metabolism in a similar way. Careful metabolic studies prove that there is no metabolic effect from massage comparable with that which is exerted by physical exercise. It seems probable, therefore, that massage in nervous patients exerts its good effect through stimulation of the sensory nerves of the skin and muscles, through facilitation of the lymph flow, and, in part at least, through its psychic effect.

More important, however, than the rest, the diet, and the massage in the treatment of the psychoneuroses is the use of the patient's mind in bringing about the cure. Psychotherapy and re-education are the sheet anchors of the therapeutist in the functional neuroses.

The exact mode of application of the psychic measures in the treatment of nervous disease will vary with each practitioner, and everyone does best to develop the methods most suitable to his own personality and his own needs. Certain general directions, however, may be helpful, and certainly during the last fifty years great progress has been made in the application of psychic methods in re-educating nervous patients back to health. At the outset of the treatment a full explanation of the condition of the patient to herself is a great help. It is unwise to deceive her. If an organic lesion exists, it should not be denied, although it may be necessary to refrain from laying emphasis upon it. Any direct question that the patient may ask should be frankly answered, and she should be told, as far as the physician is able to tell her, the meaning of any lesion which exists and the relation of the symptoms to it. If no organic lesion can be found on the application of careful tests, it is a great comfort to the patient to be told unhesitatingly by the physician the negative results of the study. Her mind is relieved, and when she is assured by the doctor that the symptoms are in his opinion "nervous" in origin, and curable, her hope is excited and she makes a start toward getting well.

Much encouragement is necessary to the depressed patient, especially where a fear of insanity or of incurable disease exists, and the physician who undertakes properly to care for these patients must be willing to spend a good deal of time with them. A visit of half a minute or a minute is totally insufficient; they often require a long explanation and a full statement, especially at the outset. Too much time, however, should not be spent with the patient, for then the physician's assurances will lose in force. Brief, clear, and emphatic pronouncements are most helpful; argumentation with a nervous patient should never be indulged in, for, in my experience, it only does harm to argue with irritable nerves.

The method of avowal, that is the open declaration by the patient to the physician of any painful or secret experience which she may believe to be associated with the origin of her symptoms, should be encouraged. The delicacy of such conversations should, however, always be borne in mind, and the physician must win the confidence of his patient before he can expect full frankness regarding these experiences. Any unnecessary inquisitiveness into the patient's past experiences should always be avoided, and when an avowal is necessary and important, the physician should see to it that it is made without injury to the self-respect of the patient. The physician should not shrink from the trouble of listening to the unburdening of soul; a knowledge of the mental content of the patient will often give him clues for the exertion of salutary psychic influences, and the " confession " is nearly always followed by relief to the patient.

In this connection the so-called " psycho-analysis," described by Freud, of Vienna, is very interesting. By this method, an attempt is made to discover by particular association tests the existence of complexes of ideas to which strong feelings are attached. Jung, of Zurich, has of late been working out a method which he asserts is practical for clinical analysis, and Jung's method, it is said, yields results much more quickly than the slower process used by Freud. By the use of suitable stimulus-words and watching the reactions, it seems possible to tell when a definite, painful, psychic complex, unbearable in the patient's consciousness and accordingly suppressed, has been touched. By laying this complex bare and disintegrating it, it is said to be possible to help severe forms of psychoneuroses which have been entirely irresponsive to other therapeutic means; especially in the severer forms of hysteria, successes, it is said, have been scored by this method.

The two most important measures in psychotherapy are, however, those known as persuasion and suggestion.

In the use of persuasion the physician makes an appeal to the higher psychic functions; the mind is won over by the presentation of suitable reasons, and not by the exertion of authority, force, or fear. In suggestion, on the contrary, an idea is introduced into the brain of the individual without his control; the higher functions are not utilized, or if affected, they are inhibited; the influence is exerted through the subconscious mind.

Even when an effort is made to restrict psychotherapeutic efforts to persuasion, just now the measure more popular among medical men, it is difficult to say how much of the effect is really due to persuasion, and how much of it to suggestion; at any rate, the physician usually feels more comfortable himself if he endeavors to produce his psychotherapeutic effects through the use of the patient's reason, than by resorting to the more occult influence through the subrational.

The establishment of medical obedience from the very beginning of the treatment is essential. The coöperation of the patient must be gained, and she must give an unequivocal consent to do exactly what she is told to do, at least during the first period when she is under the physician's care. She should be told that she will not be asked to do anything unreasonable, or to follow any instructions prejudicial to her welfare, but that she must obey, even when the reason of some of the orders may not be clear to her, or seem to her trivial and arbitrary. It is wise to leave nothing to the decision of the patient at first, and it is especially important that neither the doctor nor the nurse yield to whimsical requests, or alter a routine inaugurated, because the patient offers objection to it. Exhortation and all forms of moral treatment are better avoided at the beginning, especially in the severer cases. Later on the patient will, in all probability, wake up to an understanding of her condition herself, or she may be gradually instructed regarding it. After the physical side of the treatment has been fully cared for, it will become necessary by steady training to improve the attention of the patient, and to educate her emotions and her will. Gradually, as a result of this training, she may learn completely to control herself, and the medical absolutism may be replaced by self-direction. As Dubois points out, it is well to hold before her the ideal of " mistress of herself," as something at which she must constantly aim.

The physician should not underestimate the importance of a proper kind of nurse to aid him in the treatment of his nervous patients. Not every woman graduated from a training school is suited to this kind of work. It is necessary that the special nurse have a strong character, and good control of her own emotions; moreover, it is desirable that she have an education equal to or better than that of the patient whom she cares for. If she also possess the social qualities which will endear her to her patient, it is a distinct advantage. Above all she must know how to make herself respected and esteemed, and she should be given adequate authority, in order that her directions shall be followed, although it is an essential that in all her relations to the patient she must be good-natured and kind. The physician, on his visits to the patient, must show by his behavior to the nurse that he regards her as his representative in his absence, that he has confidence in her, and that he expects the patient to consent to everything that is done for her without objection. It is just as well, however, for the nurse to let the patient feel that everything that is done for her is the result of specific instructions given by the physician, for patients will resent discipline which they have reason to believe has originated in the nurse's rather than in the doctor's mind. During convalescence the physician must avail himself of various methods of psychic stimulation and re-education, and here his knowledge of the world and of the men and women in it, their hopes, their desires, and their failings, will be most helpful to him. He must consider how to keep the attention of his patient focussed upon her cure, and how to prevent her from giving herself unhealthy suggestions. In other words he must teach her so to train her attention that the action of the mind becomes healthy, and that it cease to dwell upon the abnormal. He must excite in his patient the desire to get well, and must convince her as the treatment progresses that she is in reality getting well. He must teach her the importance of overcoming little difficulties, assuring her that as she does one thing after another to which she may be disinclined, she will acquire an ever-increasing power of self-control, and that sooner or later her self-mastery will be regained.

On the emotional side, a prolonged training is often necessary in order to get rid of abnormal fears, anxiety, and apprehension. The patient should be taught to cultivate the useful and invigorating emotions; she should be taught the dangers of excessive emotion of any kind, and the great harm of indulging in such passions as anger, hate, and fear. The positive rather than the negative side should be followed. Faith, hope, and love should be encouraged, and then worry, fear, and despair will disappear of themselves. Finally, work, physical and mental, must be undertaken, for in a properly directed occupation-therapy lies the greatest hope for making the cure permanent. These nervous women have to be educated gradually how to take up their work, and the physician's ingenuity will be greatly taxed in order to decide as to the particular physical and mental occupations suited to the individual cases coming under his care; one patient will be benefited by gardening, another by some active mental pursuit. In all cases the program of the day should be carefully arranged, and the patient should be encouraged to follow it closely. The work should be chosen in accordance with the ability and previous training and occupation of the patient. It should be interesting to her and should be such as to be capable of giving expression to her better self.

This is scarcely the place to deal with the use of suggestion, and especially of hypnotic suggestion. That this method of therapy is advantageous in some cases there can be no doubt, but experience has taught that the application of hypnotism is much more limited than those who hailed it so enthusiastically at first were inclined to believe. It is possible, however, that fear of the appearance of quackery and charlatanism has prevented physicians from making use of this measure even to the extent to which it may very properly be applied.

CHAPTER XXIV.

APPENDICITIS AND DISEASES OF THE PELVIC ORGANS.

Conditions under which appendicitis is associated with disease of the pelvic organs, p. 562. Appendicitis and coexisting pelvic disease: Inflammatory disease, p. 563; tuberculosis, p. 564; tumors, p. 564. Independent affections of the appendix and the pelvic organs, p. 565. Differential diagnosis between appendicitis and pelvic disease: Inflammatory disease, p. 565; ovarian cyst, p. 566; ruptured tubal pregnancy, p. 567. Appendicitis and dysmenorrhea, p. 568. Appendicitis in the child, p. 571.

CONDITIONS OF ASSOCIATION BETWEEN APPENDICITIS AND PELVIC DISEASES.

The earliest allusion to a relation between inflammation of the appendix and diseases of the reproductive organs was made, I believe, by H. C. Coe (*New York Polyclinic*, 1894, vol. 4, p. 73), and almost simultaneously by J. T. Binkley (*Amer. Jour. Obst.*, 1894, vol. 29, p. 474). Both of these observers call attention to the fact that appendicitis may be associated with disease of the uterine adnexa, and that the primary infection may be seated either in the appendix or in the tubes and ovaries. Contributions to the subject have appeared repeatedly since then, and it is now a well-recognized fact that disease of the pelvic organs in women may be associated with disease of the appendix in any one of the three following ways:

First, the disease of the appendix is primary and that of the pelvic organs secondary. Second, the disease of the pelvic organs is primary and that of the appendix secondary. Third, the disease of the pelvic organs and the disease of the appendix coexist, independently of each other.

In my clinic at the Johns Hopkins Hospital I had occasion, during the ten years immediately preceding the year 1904, to remove the appendix in two hundred and forty cases, the majority of which were combined gynecological and appendical affections. Of these two hundred and forty cases, there were ninety of acute appendicitis uncomplicated with any gynecological affection; in sixteen others the appendix was removed purely as a prophylactic measure; while in the remaining one hundred and thirty-four cases a gynecological affection of some kind was associated with disease of the appendix. These statistics agree very fairly with those of Hermes (*Deutsch. Zeitschr. f. Chir.*, 1903, vol. 68, p. 191) and of Peterson (*Trans. Amer. Gyn. Soc.*, 1904, vol. 29, p. 350). Hermes performed seventy-five laparotomies for the relief of pelvic disease and found that in forty cases, or a little over fifty-three per cent, the appendix was affected; while Peterson, in two hundred operations of the same kind, found that the appendix was diseased in nearly fifty per cent.

APPENDICITIS AND ASSOCIATED PELVIC DISEASE.

In some cases where it is definitely known that a gynecological affection exists, it is a matter of importance to decide whether or not there is a complicating appendicitis. The fact that the appendix is frequently involved in pelvic affections is now too well known for such accidents to occur as that reported some years ago by Tait and Wiggin, in which, during the course of an operation upon the pelvic organs, the appendix (being involved in dense adhesions) was removed without the knowledge of the operator, and the fact discovered only on the autopsy table. It must always be remembered that when independent affections, either acute or chronic, coexist, one may be masked by the predominating symptoms of the other. This fact is of special importance in the case of an acute pelvic inflammation. Appendicitis should be suspected when there is extreme severity of both abdominal and constitutional symptoms, with paroxysmal pain localized at or near McBurney's point.

Pelvic Inflammatory Disease.—Pelvic inflammation is by far the most frequent disease of the pelvic organs complicating appendicitis. Out of the hundred and thirty-four cases in my clinic in which appendicitis was found to be associated with pelvic disease of one kind or another, there were sixty-four in which the pelvic affection was inflammatory. In the majority of cases in which inflammation of the pelvic organs and disease of the appendix are associated, the primary infection is in the pelvis. The associated diseased conditions are not always on the right side, for in the case of an unusually long appendix and an abnormally movable cecum, it is quite possible for the appendix to become attached to the left tube or ovary. In forty-four cases, cited by Peterson, the disease was confined to the right adnexa in eight instances, to the left adnexa in six, while in thirty cases both sides were affected.

Even when the appendix does not occupy the pelvic position it is possible for it to become infected under certain conditions, as in puerperal infections or in gonorrheal salpingitis, if the enlarged tube happens to be situated a little higher up than usual. Generally the appendix is attached to the tubo-ovarian mass by more or less firm adhesions, the appendix itself showing practically no gross changes; but careful examination of such appendices reveals that comparatively few are perfectly healthy, a mild catarrhal inflammation being the affection most often found. More severe lesions are not uncommon, an unsuspected diffuse inflammation being found in certain cases at operation; moreover, there may be various residual conditions, namely, strictures, obliteration, or cystic distention.

The causal relation of the pelvic disease to the inflammation of the appendix may be direct or indirect. In the first case, the appendix is involved in the pelvic exudate from the beginning; the adhesions thus formed become organized, and blood and lymph vessels are established between the appendix and the tube, through which the infection is readily transmitted. It seems probable, however, that the pelvic disease usually limits the movements of the appendix by fixing it in adhesions, and by producing stasis, acts as a predisposing factor in the development of appendicitis. The history of the onset and progress of the illness is the most important point in determining its original focus. It is frequently possible to obtain a clear history of puerperal or gonorrheal infection; but in these cases, clinical evidence of the appendical complications, as a rule, is conspicuously absent.

Tuberculosis of the Pelvic Organs.—This condition not infrequently involves the appendix in the peritoneal adhesions which usually accompany it, and in a number of cases the walls of the appendix are invaded by the tubercular process, even where there is no evidence of other extension of the disease. Out of seven cases which I examined, where the appendix was adherent to the tubercular tube, it was slightly infiltrated with tubercles in four.

Tumors of the Uterus and Ovaries.—Adhesions between the appendix and cysts of the right ovary are frequently observed, and occasionally the appendix is attached to a left ovarian cyst. Out of about three hundred operations for cystoma in the Johns Hopkins Hospital, the appendix was found adherent to tumors of the right side in sixteen cases, and to those of the left in three. In some instances the appendix is merely secondarily involved in the general adhesions which so frequently surround pelvic tumors, and are the residue of an old widespread peritoneal reaction. Dermoids and cysts with torsion of the pedicle are particularly apt to give rise to general adhesions, and it is in such cases that the appendix is most often involved. In our series of cases, the cyst had become twisted upon its pedicle in one-fourth, and in these the appendical adhesions were unusually dense and extensive. In some instances the appendix is adherent to the otherwise smooth surface of the cyst, or to the broad ligament. In some cases the tip only is adherent; in others the entire appendix, including its mesentery, is plastered to the surface of the tumor. The organ itself may be practically normal, but in the majority of instances its walls are thickened and rigid, while kinks, strictures, and other results of an inflammatory process are commonly present.

Parovarian cysts also are frequently complicated by appendical adhesions or by acute or chronic appendicitis. In malignant ovarian growths the appendix may become invaded secondarily by the new growth. Uterine myomata are less frequently complicated by disease of the appendix than ovarian cysts, and as in ovarian tumors the appendix usually presents evidence of chronic inflammatory changes. Extra-uterine pregnancy is complicated with appendicitis in a considerable number of instances. Personally, I recall seven cases, forming about ten per cent of the cases of extra-uterine pregnancy in my clinic, in which the appendix was adherent to the sac, or was acutely inflamed.

INDEPENDENT AFFECTIONS OF THE APPENDIX AND THE PELVIC ORGANS.

The possibility of the coexistence of pelvic and appendical disease must always be borne in mind, especially in cases which are being treated for pelvic disease. Quite often, after removal of ovarian or uterine tumors not complicated by adhesions, investigation of the cecal region will reveal the presence of independent appendical disease. Thus, in a case of myoma under my own care, the appendix was found completely filled and distended by two large concretions; in another case of myoma, the appendix was obliterated and enveloped in adhesions. In cases of extra-uterine pregnancy the existence of an independent appendicitis has been frequently observed. T. H. Chase (*Hahn. Month.*, 1903, vol. 38, p. 520) cites an interesting case of a young woman who was brought into the hospital with a history of trauma over the right lower quadrant of the abdomen, produced by falling face downwards in the street upon a pile of cobble-stones. On her entrance, three bruises were visible over the right iliac fossa. After keeping her under observation for a few days the abdomen was opened, and a chronic salpingitis was found on the right side, with an acutely inflamed appendix, but no signs of communication between the two.

The treatment of appendicitis and coexisting pelvic disease, whether independent of, or related to each other, belongs in almost all cases to the surgeon, and such cases should be referred to him as soon as they are recognized.

DIFFERENTIAL DIAGNOSIS BETWEEN APPENDICITIS AND PELVIC DISEASE.

The differential diagnosis between appendicitis and disease of the pelvic organs is of much more importance to the general practitioner than the diagnosis of coexisting disease, whether independent or not, because in the early stages of certain affections, early salpingitis for example, palliative treatment may be all that is needed; whereas, in acute appendicitis, immediate operation is imperative.

Inflammatory Disease of the Uterine Adnexa.—The affection most often confounded with appendicitis in women is inflammation of the ovaries and tubes. Each condition presents characteristic differences, however, and careful attention to these and to the history of the case in its early stages ought to prevent mistakes. Abdominal pain, associated with nausea and vomiting, may appear as suddenly in one affection as in the other, and there may be pain on local pressure over the right lower abdomen in both, but in pelvic disease the local pain and tenderness are usually situated more deeply in the pelvis and the right inguinal region, intense suffering being elicited on deep palpation over Poupart's ligament. Vaginal examination may show tenderness in both cases, but if it is on both sides, or is confined to the left side, the trouble is probably perimetritis and not appendicitis. There are, however, cases in which confusion may arise because the appendix occupies the pelvic position, and therefore the pain and tenderness are situated deep down in the pelvis; moreover, if the organ is of unusual length, it may extend to the left even as far as the opposite side. In such cases reliance must be placed on the earlier symptoms as described in the history. In the onset of appendicitis the pain is apt to be paroxysmal in character, while in pelvic inflammation it is more steady and less intense. Pelvic inflammation is usually accompanied in the early stages by a vaginal discharge, sometimes of a yellowish character, and often associated with burning on urination; these symptoms may exist several days before the abdominal pain appears. With appendicitis there is often a history of previous attacks of pain or digestive disturbance. It is not usual to find a tumor in the early stages of either affection, but later on a more or less well-defined resistance, situated posterior or lateral to the uterus, is generally present in both, and it may signify either pelvic inflammation or pelvic appendicitis. In appendicitis, however, the resistance is usually situated higher up and extends from the posterior border of the right broad ligament to the iliac fossa; whereas in pelvic inflammatory disease the tumor is deep down in the pelvis, and it is often possible to determine the enlarged tube by bimanual, vaginal, and rectal palpation. R. T. Morris considers that abdominal rigidity is the principal diagnostic sign between acute appendicitis and salpingitis. If it is absent, appendicitis may be excluded with tolerable certainty. When an acute pelvic inflammation is accompanied by a spreading or general peritonitis it cannot be distinguished from appendicitis, unless there is an unusually clear and reliable history.

The development of a pelvic infection in a young girl, or an unmarried woman of good character, should always excite a suspicion of primary appendicitis, even when bimanual examination shows definite disease of the adnexa on both sides, as in many cases it will be found on operation that the tubo-ovarian disease is due to a secondary infection of the tube. As MacLaren observes, "a young woman's reputation may be smirched by the discovery of pus tubes, where operation demonstrates that the tubal suppuration was due entirely to inflammation of the appendix."

Ovarian Cyst.—Confusion in the diagnosis between appendicitis and ovarian cyst with torsion of the pedicle is very common. Niot (*Thèse de Paris*, 1901) cites eleven instances of dermoid cysts with twisted pedicle, mistaken for appendicitis; and in two out of five cases of torsion observed by Fowler, the patient had been sent to the hospital with a diagnosis of appendicitis. Acute torsion is most apt to occur in cysts of medium size, which have not previously produced any swelling, the subjective symptoms being absent or very insignificant, and this makes the diagnosis difficult. The sudden onset of severe pain, often accompanied by nausea and vomiting, may closely simulate acute appendicitis. In the early stages the character of the pain is diffuse and continuous, while in acute appendicitis, before localization in the right iliac fossa, it is colicky; at a later stage, after peritonitis has supervened, the pain is very much the same in both conditions. Sometimes it is possible to distinguish at the outset a well-rounded, elastic ovarian tumor, while in appendicitis a tumor is rarely observed in the early stages, and, if it is, it has not the sharp outline of the cyst. Fluctuation is sometimes suggested as a guide in the diagnosis of some kinds of dermoids and multilocular cysts, but it is an indefinite sign, and not to be depended upon. Palpation, which may be serviceable in outlining the tumor, is unsatisfactory in many cases on account of the rigidity of the abdominal walls. In the case of a cyst, the tumor is sometimes readily palpable after the early acute reaction subsides; whereas, in appendicitis not complicated with diffuse peritonitis, the abdomen, with the exception of the region of the appendix, becomes soft and natural. When peritonitis complicates the situation, a differential diagnosis is impossible, but in general it may be noted that the peritonitis accompanying ovarian cysts is of a milder type, and is not associated with the severe constitutional symptoms observed in peritonitis originating from appendicitis; moreover, the abdominal tenderness is usually pronounced. Examination by the vagina and the rectum may afford valuable information regarding the nature of the trouble, and it may be possible in this way not only to outline the cyst, but also to recognize the twisted pedicle, which is felt extending from the side of the uterus up to the abdominal mass.

Several instances have been reported of a mistake in diagnosis between appendicitis and ovarian disease in the child. In one of these, reported by Porter (1892), the little girl, who was eleven years old, had shown no signs of approaching puberty. She had had four attacks of pain in the right iliac fossa, one of which disappeared suddenly under the influence of a warm rectal enema, and the others spontaneously. When she came under observation during the fourth attack, there was a slight elevation of temperature with pain and exquisite tenderness in the right iliac fossa, and a sensitive tumor just above Poupart's ligament. The tenderness and the tumor both seemed to be rather too far down for the appendix, and a diagnosis of appendicitis was made with some hesitation, disease of the uterine adnexa having been considered and rejected. Operation showed a right ovarian cyst the size of a small egg, its pedicle twisted by three complete turns and showing signs of beginning gangrene.

Ruptured Tubal Pregnancy.—A diagnosis between appendicitis and ruptured tubal pregnancy is seldom difficult, if an accurate history of the events leading to the attack can be obtained, as well as a clear description of its onset. The history of irregular menstruation, especially the statement that a period has been delayed for a week or more with a subsequent slight irregular flow, is strongly suggestive of a tubal pregnancy. The onset of an attack with sudden agonizing pain followed almost immediately by fainting and marked pallor, is pathognomonic. Chills, vomiting, and involuntary evacuation of the bowels may occur at the outset of either a ruptured tubal pregnancy or an acute perforative appendicitis. Tenderness and muscle spasm over the right iliac fossa may be observed in a right tubal pregnancy; usually, however, the local signs are situated deeper in the pelvis; in bimanual examination the enlarged tube can generally be palpated. Finally, it may be said that the most important point in arriving at a correct diagnosis is the recognition of the fact that confusion may arise.

APPENDICITIS AND DYSMENORRHEA.

It is now generally acknowledged that chronic inflammation of the appendix is often associated with painful menstruation. Ochsner, writing on appendicitis as a cause of inflammatory disease of the uterine adnexa (*Jour. Amer. Med. Assoc.*, 1899, vol. 33, p. 192), makes a passing allusion to dysmenorrheas arising from the association of appendicitis with disease of the ovaries or tubes on the right side, and remarks that whenever the pain in dysmenorrhea is entirely on the right side, especially if it is situated high up, it is well to suspect that the disturbance of the appendix is complicated with disturbance of the ovaries.

In the next year A. MacLaren published an interesting paper on the relationship between dysmenorrhea and chronic appendicitis, in which he emphasizes the fact that in chronic appendicitis, menstruation is often painful without any disease of the uterus or adnexa (*Amer. Gyn. and Obst. Jour.*, 1900, vol. 17, p. 14). He calls attention, most appropriately, to a class of cases familiar to every physician of experience, in which a young girl, who has menstruated for several years without any disturbance or suffering whatever, suddenly takes cold or has some slight inflammatory symptoms, after which she begins to suffer with the menstrual period, the pain increasing each time until her nervous system is more or less shattered. These cases are usually considered to be neurasthenic, and there is no doubt that many of them, possibly the majority of them, are so; but, in MacLaren's opinion, there is a certain proportion in which the menstrual pain is really due to a chronic inflammation of the appendix, which undergoes a slight exacerbation at each period, on account of the congestion normally accompanying every menstruation. In some cases the chronic appendicitis exists before menstruation begins, and then dysmenorrhea is present all through menstrual life, until the appendicitis is discovered and relieved.

Other contributions to this subject have been made from time to time, but the total amount of information concerning it is small. There is an excellent discussion of the subject, however, by Soupault and Jouaust in a paper called "*Appendicite larvée et des troubles menstruels*" (*Bull. et mém. de la Soc. méd. des hôp. de Paris*, 1903, vol. 20, p. 1307). The writers begin by commenting on the fact that although medical literature is richly supplied on other points connected with the appendix, it contains scarcely anything on its relation to dysmenorrhea. Soupault had himself observed a number of cases of menstrual pain associated with appendicitis, and believed that they presented certain characteristics which should aid in the diagnosis.

In dysmenorrhea associated with appendicitis, according to him, the suffering begins several days before the flow is due and reaches its maximum just as it begins. Sometimes the pain disappears suddenly, as if by magic, as soon as the flow is established; in other cases it lasts through menstruation, diminishing gradually. It is exceptional for the attacks of pain to occur at each menstrual period; they usually accompany menstruation at more or less distant intervals, without any definite explanation of their appearance on any particular occasion. The intensity of the suffering varies in different attacks in the same person, being sometimes so slight as to be barely perceptible, while at other times it is so severe as to be unmistakable. Occasionally, though rarely, there are symptoms of appendicitis during the intermenstrual periods, and when this is the case the diagnosis is greatly facilitated. Gastro-intestinal symptoms, especially entero-colitis, are often present as well and contribute greatly to an understanding of the case.

Certain other signs and symptoms observable during the attack are, in Soupault's opinion, strongly suggestive, if not absolutely diagnostic. The most constant of these is spontaneous pain situated low down in the right iliac fossa and limited strictly to the right side. It is rarely lancinating in character, but resembles colic, and is accompanied by a sensation of discomfort and of pressure in that locality. The pain is generally intermittent and transient; it yields readily to mild therapeutic measures and usually disappears on the appearance of menstruation. There is tenderness on pressure over the right iliac region, but not by any means always over McBurney's point; it is often near the umbilicus or it may be in the groin, in which case it is liable to be attributed to the right ovary. It is noticeable that the tenderness disappears as soon as the attack is over, and the right iliac fossa becomes soft and painless during the intermenstrual period. The abdominal pain is almost always accompanied by some digestive disturbance which lasts only a short time. There may be nausea and vomiting, at first of food, and afterwards of bile. The presence of diarrhea and vomiting, either separately or together, is of great diagnostic importance.

The constitutional symptoms are not well marked. There may be a little headache, pain in the limbs, and shivering, but these all disappear spontaneously. The point of great importance in these cases is the temperature. When taken in the axilla it is often quite normal, when, if taken in the rectum at the same time, there will be some elevation, 37.5° to 39° C. (99.5° to 102° F.). The pulse shows a corresponding acceleration, being usually about 100. These modifications of pulse and temperature are constant, and it is upon them that the diagnosis chiefly rests.

According to Soupault the association between menstrual pain and appendicitis may be explained, in some cases, by the fact that there are adhesions between the appendix and the adnexa on the right side, in which blood vessels and lymphatics develop, and these become easily congested under the influence of menstruation. In other cases, where no adhesions are present and the appendix lies free in the abdominal cavity, it is easy, he thinks, to explain the congestion by means of vaso-motor disturbances affecting an organ in a state of lowered resistance.

Soupault cites seven cases of dysmenorrhea associated with appendicitis out of the number observed by him, and I give one of them which affords a good illustration of the chief diagnostic points.

Case VII.—Miss R., nineteen years old, seamstress, of a robust appearance. She had always had good health and had menstruated regularly and without suffering until a year before, when she had an attack of abdominal pain limited to the right side and accompanied by vomiting of a greenish character. The attack occurred two days before menstruation and lasted forty-eight hours, subsiding as soon as the menstrual flow appeared. She remained in bed during the menstrual period, and then got up, feeling perfectly well. During the ensuing year she had three similar attacks and was also troubled with a certain amount of entero-colitis, with mucous stools. At the end of nearly a year she had a fourth attack, when she was seen by Soupault. Her temperature was then 39° C. (102° F.); there were nausea, bilious vomiting, diarrhea, and pain on pressure in a circumscribed location in the abdomen, low down and near the groin. These symptoms had been present for two days when she was seen. As soon as menstruation appeared, they all began to subside and disappeared gradually as menstruation proceeded. A diagnosis of chronic appendicitis was made and laparotomy performed two weeks later, when the appendix was found to be much enlarged and surrounded by adhesions. At its lower end there was a cavity containing a small quantity of malodorous pus. The patient had no further trouble with menstruation and the entero-colitis also disappeared.

In many cases of dysmenorrhea, where the pain is entirely on the right side, it is well to suspect appendicitis, especially if the patient has been free from pain in the early years of menstrual life. If, on careful observation of the attacks, the diagnostic points given by Soupault can be established, namely, the disappearance of pain on the establishment of menstruation, or at any rate at its close, the presence of diarrhea and other digestive symptoms, and, especially, the elevation of temperature when taken in the rectum, it is tolerably safe to conclude that the case is one of chronic appendicitis in which the dysmenorrhea is merely a manifestation.

The only class of cases in which the diagnostic peculiarities do not hold good, in Soupault's opinion, is that in which it is necessary to differentiate between an inflamed appendix and a lesion of the right tube and ovary giving rise to pain in menstruation. The symptoms just discussed may be found in such cases as well as in those where the appendix alone is at fault, and the physician must depend upon the history of the individual case for his differential diagnosis, making special inquiry as to the possible infection of the genitalia, the presence of menstrual irregularities, and of muco-purulent vaginal discharges. One point of importance is the fact that a lesion of the uterine adnexa rarely remains quiescent between the menstrual periods, while in the class of cases under discussion it is unusual to find any expression of the trouble except at menstruation. In either instance such cases belong to the surgeon.

Finally, I would call attention to the fact that dysmenorrhea is sometimes the direct result of acute appendicitis. An inflammation of the appendix, which subsides without operation, will occasionally be followed by dysmenorrhea, when the patient has previously been free from menstrual suffering altogether; and whenever this is the case, the presence of a chronic appendicitis should be suspected.

The treatment of dysmenorrhea associated with appendicitis does not differ from that of dysmenorrhea from other causes. The prominence of the digestive symptoms will probably call for remedial measures. For the vomiting I know nothing better than the prescriptions given already for use in chlorosis (see p. 144); while for the diarrhea the best remedy is the combination of bismuth and paregoric.

℞ Bismuth. subnit. .... ʒij
Tinc. opii. camph. .... f℥jss.
Aq. dest. ....q. s. ad. f℥vj
M. S. Shake well and take one tablespoonful every four hours, until pain subsides.

The question of operative treatment belongs, of course, to the surgeon, to whom the case should be referred without loss of time. It would seem that this is a class of cases which, as Soupault suggests, is peculiarly suited to interval operation (*opération à froid*) during the intermenstrual periods.

APPENDICITIS IN THE CHILD.

It may not be out of place here to say a few words in regard to certain peculiarities of appendicitis in the child.

There is an undoubted etiologic relation between intestinal worms and certain forms of appendicitis in children. Ascaris is the variety most frequently found, trichocephalus next, and then oxyuris. The frequency with which trauma figures in the causation of appendicitis is now an accepted fact, and it is plain, of course, that with children, whose activity exposes them especially to its influence, trauma must especially be often a causal factor.

The diagnosis of appendicitis in children is frequently obscure. There is sometimes a prodromic stage, in which there is more or less of gastrointestinal disorder without any signs distinctly suggestive of appendicitis. In children there are apt also to be misleading symptoms associated with the thoracic viscera, and often the first indication of appendicitis in a child is a pneumonia, a pleurisy, or even a bronchitis. The examination of a child for appendicitis should never be considered complete without an examination of the chest.

Another noteworthy point in the early diagnosis of appendicitis in children is that the early stage of it is apt to be associated in them with disturbances of motion. A few cases have been reported in which the first symptom observed was a difficulty in walking. Dr. R. D. Freeman, of South Orange, N. J., reported to me a case in which he was calling upon another member of the family, when he happened to notice a little girl, eleven years old, who was limping as she played tennis in the yard close by and standing in a position suggestive of hip disease. On inquiry it was found that she had complained for a few days of indefinite pain in the lower abdomen, and on calling her into the house and making an examination a tender fluctuating mass was found in the right iliac fossa. The right leg was flexed and abducted, there were muscular rigidity over the lower abdomen and considerable pain on pressure over and around the mass. The rectal temperature was 103° F., and the pulse 90. She had had no considerable pain at any time and no chill. At the operation, performed at midnight of the same day, a large abscess surrounding the appendix was evacuated and the remains of a sloughing appendix removed.

V. P. Gibney (*Amer. Jour. Med. Sci.*, 1881, vol. 81, p. 119) has reported cases of appendicitis mistaken for hip disease, and several striking cases of this kind have come under the observation of Drs. W. S. Baer and J. M. T. Finney of Baltimore.

An examination by the rectum should never be neglected in appendicitis in the child, since the index finger reaches higher in the infantile pelvis than in that of the adult, and thus the suspected area is more easily touched. It has been shown that in almost every case where the disease has extended beyond the appendix the extension has taken place along the right pelvic wall, where the inflammatory mass can readily be felt. In making his abdominal examination, the surgeon should always bear in mind that the adhesions in a child are extremely delicate, and more than ordinary care must be exercised in order to avoid rupturing them. A case has been known in which the adhesions around a localized abscess were ruptured during sleep, and another in which rupture took place during an effort at stool.

Whenever an attack of appendicitis in the child is suspected, the patient should be kept in bed and an ice-bag placed over the abdomen. The diet should be liquid, and sufficient opium prescribed to keep the bowels at rest. It is of the utmost importance in these early stages to avoid active treatment, such as purgatives and enemata, which are calculated to do much harm. A specialist should always be called, if possible, as soon as any suspicion of appendicitis is entertained. Should an operation be performed, the child is often very restless after its performance, and to keep it quiet becomes a difficult matter. Under these circumstances a Bradford frame affords an excellent means of assuring relative immobility for the first few days, while the infected area is being walled off from the general cavity of the peritoneum.

CHAPTER XXV.

(1) SPLANCHNOPTOSIS—ENTEROPTOSIS—GLÉNARD'S DISEASE. (2) MOVABLE KIDNEY.

(1) Splanchnoptosis—Enteroptosis—Glénard's disease, p. 573.
(2) Movable kidney: Anatomy, p. 581. Amount of normal and abnormal mobility, p. 582. Etiology, p. 582. Frequency, p. 584. Palpation of kidney, p. 585. Symptoms, p. 586. Differential diagnosis, p. 589. Treatment, p. 593.

SPLANCHNOPTOSIS—ENTEROPTOSIS—GLÉNARD'S DISEASE.

Splanchnoptosis, from the Greek words signifying descent of the viscera, has been much studied during the past few years. The original term enteroptosis should be used according to its etymology to signify descent of the intestines, although it is used by most people as a synonym for splanchnoptosis, that is, to mean descent of all the abdominal viscera. In designating the special form of descensus we use special terms, thus: gastroptosis, of the stomach; hepatoptosis, of the liver; nephroptosis, of the kidneys; splenoptosis, of the spleen, and coloptosis, of the colon. In Figure 158 I have given an illustration of the various visceral ptoses based in part on a series of splendid studies made by Clark and Pancoast of Philadelphia.

To the anatomists and pathologists we owe the first recognition of the disease, Morgagni being the first to describe the condition anatomically, while Virchow, in 1853, called attention to displacement of the intestines, ascribing the condition to partial peritonitis, and regarding its mechanical effects as the starting point of a number of cases of dyspepsia and indigestion. Among the older clinicians, Aberle, Rayer, Rollet, and Oppolzer referred to the relation between hysteria and floating kidney, and Kussmaul called attention to the symptoms due to change in form and position of the stomach.

It was Glénard, however, the distinguished physician of Lyons, whose work at the adjacent health resort of Vichy brought him in contact with many cases of digestive disturbance, who first aroused general interest in this condition. The disease is therefore often spoken of as Glénard's disease. Glénard believed that in enteroptosis he had found the anatomic basis for one type of, so-called, nervous dyspepsia.

Anatomy.—To go into the anatomy of the abdominal viscera is not within the scope of the present work. Suffice it to say that they are held in position by a number of different forces: by the negative pressure of the thoracic cavity acting through the diaphragm; by vascular, peritoneal and ligamentous attachments; by the pressure of the different organs upon each other; and by the supporting power of the abdominal muscles.

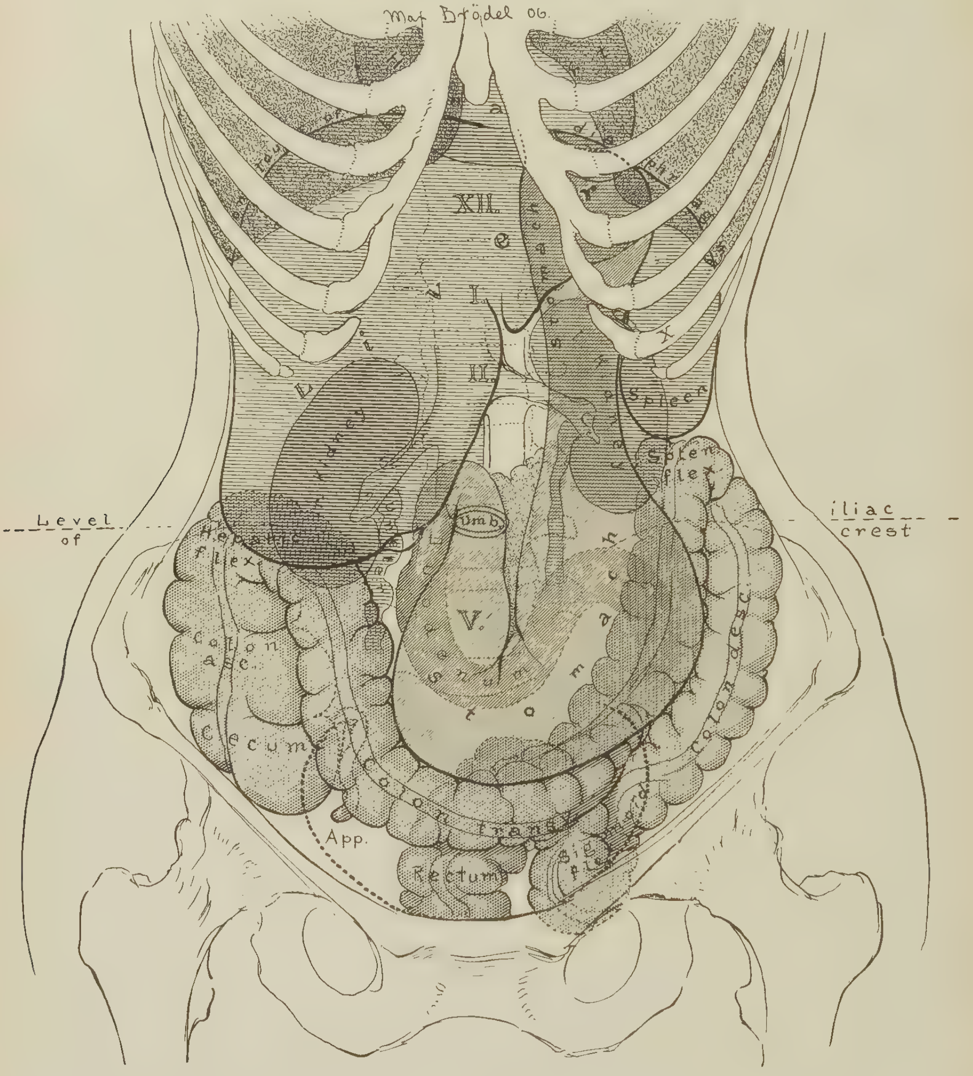

FIG. 158.—COMPOSITE PICTURE FROM OVER 100 SKIAGRAPHS IN POSSESSION OF DR. H. K. PANCOAST, OF PHILADELPHIA, SHOWING DISPLACEMENT DOWNWARD OF ALL THE ABDOMINAL ORGANS AS THE RESULT OF CONSTRICTION OF THE LOWER THORAX. The liver shows Riedel's lobe; the stomach has descended into the pelvis, carrying the transverse colon with it. Note the hour-glass contraction of the fundus of the stomach. The right kidney has descended moderately. (From forthcoming "Surgery of the Kidney," by H. A. Kelly.)

Normally, however, no organ is absolutely fixed, each being capable of slight movements due to various physical factors, such as the position of the patient, the amount of food ingested, the passage of urine and feces, and the respiratory and circulatory movements.

In advanced cases of splanchnoptosis the position of the viscera very closely resembles that seen in embryonic life, and this is regarded by some persons as an argument in favor of the congenital origin of the condition.

Etiology.—As regards the pathogenesis of splanchnoptosis very divergent views are held, some authorities maintaining that the condition is congenital, others that it is acquired, while others again hold a middle ground. Glénard believes that the first step in the condition is a falling of the right colic flexure, due to a weakening of the hepato-colic ligament; it may follow pregnancies, strains, injuries, abdominal operations, wasting diseases, appendicitis, etc., but it is primarily due to a constitutional defect affecting the strength and supporting powers of the mesenteric tissues. Stiller believes that there is a characteristic sign of the condition in the floating tenth rib, while Mathes states well the congenital theory, when he says "splanchnoptosis is a constitutional hereditary anomaly of the entire organism, a lack of vital energy in all the vital tissues."

Many persons believe that the condition is acquired, not based on a congenital defect, and as special causes of the condition they mention the wearing of tight belts and corsets, pregnancy and parturition, wasting diseases, the removal of abdominal tumors or of ascitic fluid—in fact, any condition which tends to increase the pressure above the abdominal organs, decrease the pressure below them, or diminish the size or the expansile power of the lower thoracic zone. According to Keith, who has done much work on this subject, splanchnoptosis is the result of a vitiated method of respiration, and should be assigned to a place among the respiratory diseases; he believes that the contraction of the diaphragm, especially the crura, is the most important agent in producing the displacement, although before this descensus takes place, either the thoracic supports of the diaphragm must have yielded, or the antagonistic abdominal muscles been hampered or weakened, as, for example, by tight corsets. A study of a large number of cases has convinced me that, although the condition may be acquired in a number of cases, in the majority, the underlying cause is a definite congenital defect, and that this latent predisposition is fanned into the actual disease by some malady of an exhausting nature, such as conditions associated with loss of weight, especially if rapid; conditions which produce sudden changes in the intra-abdominal pressure; lack of proper nourishment; and increased pressure in the lower thoracic zone, as by tight lacing.

Symptoms.—The symptoms of splanchnoptosis are extremely varied. On the one hand, there may be no symptoms whatsoever, while on the other, the symptom-complex may be more protean and complex than in almost any other condition. Certain symptoms are especially referable to the ptosis of the special viscera, while other symptoms are dependent upon the degree of involvement of the nervous system. As to the relation between neurasthenia and splanchnoptosis there is a wide divergence of opinion, some holding that the neurasthenia is essential, the splanchnoptosis incidental, others the reverse view, while still a third group believes, and I think rightly, that in most cases each condition represents a congenital fragility of tissue, independent, primarily, of the other, but reacting very deleteriously upon it, moreover the two are frequently associated. The picture usually presented is that of a thin, pale, young man or woman with a deficient amount of fat, a nervous and worried expression, a long thorax constricted in its lower half, and thin, soft abdominal walls, who complains of many dyspeptic and nervous symptoms and sometimes of pain in various portions of the abdomen as well. The patient often complains of a feeling of lack of abdominal support, and sometimes of a loose body in the abdominal cavity. Glénard himself divides the symptoms into three special groups—lack of tone of the abdominal walls, descent of the various abdominal viscera, and a stenotic condition of the large intestines. Others have paid especial attention to the respiratory and circulatory symptoms, dyspnœa, asthmatic attacks, etc.

As to symptoms referable to a special organ it must be remembered that in many cases they are due to the displacement of several viscera, not of one, but the author sometimes loses sight of other ptoses, and ascribes all the symptoms to the descensus of the organ he is especially studying. This is peculiarly the case in displaced kidney, for many of the symptoms ascribed to this condition are in reality due to descensus of the stomach or of the intestines; while our gynecological brethren should remember that, in many cases, retroflexion or retroversion of the uterus is but a part of a general splanchnoptosis, the vast majority of the symptoms ascribed to the displaced uterus being in reality due to the displacement of other organs. Under these conditions, the expectation of relief from all symptoms by suspending the kidney or the uterus is absolutely without foundation, and is based on a complete misconception of the facts.

Symptoms especially associated with the stomach are the splashing sound, which is often heard, and others referable either to the associated atony of the stomach wall, or to the dilatation, which so frequently accompanies gastroptosis, and the associated anomalies of gastric secretion. In cases of displacement of the stomach, especially of the vertical and subvertical type, gastrectasy is very likely to occur with its characteristic symptom-complex, particularly if the patient indulges in frequent indiscretions of diet, while in gastroptosis subacidity is the rule, the degree of diminution of the free hydrochloric acid depending upon the extent of the associated dilatation.

Of symptoms especially referable to movable kidney alone may be mentioned Dietl's crises, intermittent hydronephrosis, hepatic colic, due to pressure on the duct, pain either dull and constant, or intermittent, and the feeling of a floating body in the abdomen, due probably to congestion of the kidney, while recently many persons have called attention to the frequent association which seems to exist between right floating kidney and chronic appendicitis.

As regards the liver, hepatalgia, hepatic colic, gall-stone attacks, asthma, and the sensation of a floating body have been ascribed to this organ's displacement.

A movable spleen often gives rise to sensations of dragging and pain and the patient is almost always conscious that a body of some kind is moving about in the abdominal cavity. The symptoms, in fact, are exactly similar to those of a displaced kidney. In my own cases this movability of the spleen has not been associated with a general splanchnoptosis.

Symptoms definitely referable to displacement of the intestines are intestinal fermentation, intestinal pain, mucous colitis, and constipation.

Diagnosis.—The diagnosis of the condition is easily made; the characteristic expression and body form, the long flat chest, the weakened abdominal muscles, and the protean symptom-complex should at once attract our attention. In diagnosing gastroptosis the best methods are percussion, combined as a rule with inflation of the organ by means of carbon dioxide gas or through a stomach tube (see Fig. 159), or, more accurately still, by the use of the X-rays after making the patient swallow a bismuth emulsion. In case of nephroptosis we use palpation, examining the patient in both the prone and the upright position, and I have shown (*Amer. Jour. Obst.*, 1899, vol. 40, p. 328) that a characteristic Dietl's crisis may be produced by injecting fluid into the renal pelvis through a urethral catheter; in the case of the liver we make use of palpation, percussion and inspection, always being careful to do so with the patient in both the prone and the upright positions, also determining, as in the case of the kidney, whether the organ can be replaced in its normal position by manipulation; in the case of the spleen we palpate with the patient standing and the patient lying down, while in the case of the intestines inspection of the peristaltic movements, palpation of the stenosed portions of the intestine, inflation through a rectal tube, or X-ray photography after the injection of bismuth emulsion gives us the diagnosis.

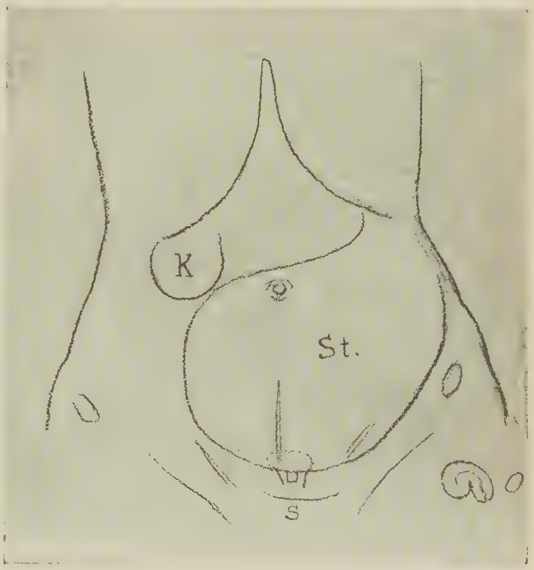

FIG. 159.—GAUZE RECORD OF MARKED DISPLACEMENT OF THE STOMACH.

Most of these patients give the so-called belt test of Glénard; that is, the symptoms are much relieved if the physician stands behind the patient and lifts up the lower abdomen with his hands, while in most cases the symptoms are markedly ameliorated by the assumption of the prone position. The characteristic body form has been studied mathematically by Harris and others, who have given a formula expressed in terms of various body diameters, which will tell whether splanchnoptosis is likely to be met with.

Frequency.—The condition is extremely common, as shown by the fact that Glénard finds it in one out of every five women who come to Vichy, and in one out of every forty men, while Einhorn finds the condition in six per cent of males, and thirty-five per cent of females; of course, it must be remembered that most of the patients who consult these physicians are suffering with digestive disorders, and the percentage is consequently considerably higher than that which would be obtained in a general clinic, although Thorndike has recently found the condition a hundred and twelve times in two hundred and seventy-two general patients in Boston. As regards pregnancy a series of several hundred cases shows that about fifty per cent had borne children, about fifty per cent had not; as regards involvement of the two kidneys, of seven hundred and twenty-seven cases of renal displacement, the right alone was involved five hundred and fifty-three times, the left alone eighty-one times, and both ninety-three times.

Treatment.—The most practical and the most important division of the subject is that devoted to the prevention and treatment of the condition. In discussing the prophylaxis of splanchnoptosis we should keep in mind that the majority of such patients have a congenital tendency, which brings about marked displacement of the various viscera, however, only after they have been exposed to various secondary influences. For this reason it is extremely important that persons with the characteristic body form, especially children, should be guarded with great care; they should be made to rest at certain times, especially after meals; everything should be done to increase their body weight; carefully selected exercises should be employed to strengthen their abdominal muscles, and massage should be given. They should be taught breathing and standing exercises so that their lower thoracic zone may be strengthened as regards its muscles, and increased as regards its volume. Careful attention should be paid to everyone during and after acute and chronic diseases, especially if associated with much loss of weight, after the removal of abdominal tumors or ascitic fluid; and after childbirth. In these last three conditions it is absolutely essential that an abdominal bandage be worn until normal intra-abdominal pressure relations obtain again. We should especially insist upon the danger from wearing tight belts and tight corsets, especially those where the pressure is applied in the hypochondriac and upper abdominal regions.

As to the treatment proper of splanchnoptosis it may be divided into three groups: (1) Treatment by medicine, diet, and general hygienic measures, including rest, exercise and massage; (2) treatment by bandages, pads, plasters, belts and supports of various kinds; (3) operative treatment. In regard to treatment it seems to me that splanchnoptosis in the majority of cases should be treated by medical, hygienic and mechanical means, while operative treatment should only be used where the symptoms are definitely referable to the displacement of an especial organ, or where, although the symptoms cannot be definitely referred to any special organ, all other means of treatment have proven failures.

Treatment by medicine, diet and general hygienic measures is of extreme importance in splanchnoptosis. As to the diet this depends largely upon the condition of the stomach, and whether or not atony and dilatation are present. Usually a simple mixed dietary is advisable, with rather small meals and often extra food in the shape of raw eggs and milk between meals; fluids had best be taken in very small amounts while eating; in some cases a dry-meat and stale-bread diet is advisable, while in a number of instances where the nervous symptoms were well-marked, I have obtained excellent results by treating the patient as in neurasthenia with systematic over-feeding begun by rest and an absolute milk diet.

As regards medicines these are but little indicated; iron and arsenic for the anemia, strychnin as a general nerve tonic, alkalies to lessen the gastro-intestinal fermentation, hydrochloric acid if the stomach shows deficiency in this, are indicated in this condition; while for the constipation aloes, cascara or the salines may be used, if successful results are not obtained by the use of enemata, especially those of oil, or by massage, electricity, hydrotherapy, and exercise. Lavage is indicated in case of gastrectasy.

Rest is extremely important, especially in those cases deficient in weight; this is peculiarly advisable after meals. In some cases a systematic rest cure has produced wonderful results in my experience. Massage both general and abdominal, systematic exercises, especially those designed to develop the abdominal and thoracic muscles, hydrotherapy and electricity, are all of value.

Treatment by bandages, pads, plasters, belts and supports of various kinds should always be tried in splanchnoptosis; the object of these is, of course, twofold: to increase the intra-abdominal pressure, and to decrease the size of the lower half of the abdominal cavity. They should always be applied with the patient on the back with the hips elevated, so that the organs will have fallen back into approximately their normal positions, and the direction of the pressure should always be from below upwards and backwards. Among various abdominal bandages may be mentioned the elastic bandage of Glénard, Longstreth's belt, Gallant's special corset, and Rose's method of bandaging with adhesive plaster. Some authors advise the use of pads, especially for supporting the liver, the kidney, and the stomach, but in my experience these have not proven satisfactory.

Operative treatment, as we have said before, should only be used in those cases where the symptoms are definitely referable to the displacement of an especial organ, as, for example, Dietl's crises in nephroptosis, or in those cases where medical, hygienic and mechanical means have been tried without success. As to the objects of the operation, they are in the main to fix the organ in approximately the normal position, and at the same time to allow a slight degree of mobility.

In the case of the kidney the old forms of nephropexy have been abandoned, such as suture through the perirenal fat, through fat and capsule, through a capsule which has been previously split and partially dissected, through the kidney substance, and packing the kidney so that strong adhesions may form. I call attention especially to the value of the Brödel stitch in nephropexy, as its holding power is from two and a half to three times that of the ordinary stitch.

In the case of the stomach various operations have been devised, such as fixation of the stomach to the anterior abdominal wall, fixation to the diaphragm, lifting the colon by fixing both its flexures to the abdominal wall, various procedures to shorten the stomach ligaments, and Coffey's operation of slinging the stomach in a hammock made of omentum; of these Beyea's gastropexy has probably given the best results.

In the case of the liver stitching the organ to the thoracic or abdominal wall and the formation of adhesions by irritating the surface of the liver have been advised.

In the case of the spleen operation is rarely necessary, but if torsion with pain, swelling, and possible gangrene occurs, splenectomy should be done.

In the case of the intestines numerous operations have been done recently: sigmoidopexy or even resection of the sigmoid; in some cases resection and anastomosis of the colon, and in some cases resection of the abdominal wall where there is a marked diastasis of the recti muscles.

MOVABLE KIDNEY.

Anatomy.—It will probably be wisest at the very outset to recall briefly those anatomical conditions about the kidney which are indispensable to a thorough understanding of the anatomy and the anatomical relations of the kidney in nephroptosis or movable kidney.

The kidneys are bean-shaped organs weighing about four ounces in the female and a little more in the male, and placed retroperitoneally in the loin on each side of the spinal column. Each kidney, measured roughly, is four inches long, two and a half inches broad, and one and a quarter inches thick, and possesses an anterior and a posterior surface, an outer and an inner border, and an upper and a lower convex extremity.

The direction of the kidneys is not exactly vertical, but rather downward and slightly outward, with their anterior surfaces looking forward and outward, while their posterior surfaces look backward and inward. The outer border is convex, while the inner border is concave and forms the hilum where the vessels and ureter join the kidney. The upper end of each kidney lies in the hypochondriac and epigastric regions, and the lower pole projects into the adjacent portions of the umbilical and lumbar regions. They extend from about the level of the eleventh dorsal to the second or third lumbar vertebra, and are thus within about two inches of the iliac crest. The right kidney is placed a little lower than the left, possibly on account of the position of the liver.

The kidney possesses several coverings or capsules of different structure and consistency, all of which probably play an important part in maintaining the organ in its proper position. Snugly encasing the kidney parenchyma is its own true capsule, a thin, smooth membrane composed mostly of fibrous and elastic tissue. Normally this capsule is not firmly united to the kidney proper, and unless there has been previous inflammation, it can be easily stripped off. The kidney with its fibrous capsule is next surrounded by a layer of fat, the fatty capsule or "tunica adiposa." This fatty capsule is permeated by fine elastic fibres and cellular tissues, which unite it to the adjacent inner and outer coverings. The union between the fibrous and the fatty capsules is, however, very delicate and they can be easily separated unless there has been some previous pathological change. The amount of fat varies in different locations, being more abundant posteriorly upon the convex border, at the hilum, and just below the lower pole, while anteriorly there is comparatively little. The perinephritic adipose layer is not marked before the tenth or twelfth year of life. The tunica adiposa has a peculiar "canary-yellow" color, which is easily distinguished from contiguous subperitoneal fat and acts as a valuable landmark in renal surgery.

We have described from within outward the kidney proper, the fibrous capsule, the tunica adiposa, and we now come to the last structure, which is of especial interest in its relation to movable kidney; that is, the perinephritic fascia, sometimes called Gerota's capsule. This is a firm, fibrous covering, composed of an anterior and a posterior layer, which meet above and to the outer side of the perirenal fat, but do not fuse below or anteriorly. Thus in a kidney of abnormal mobility the path of least resistance is downward and inward.

As mentioned above, the kidneys are placed retroperitoneally, only portions of their anterior surface coming in contact with the peritoneum.

Amount of Normal and Abnormal Mobility.—Some writers attempt to classify movable kidney according as it has or has not a mesentery, but any classification I make here will be based entirely upon clinical and not upon anatomical findings. Each kidney moves to some extent with respiration, descending during inspiration and ascending during expiration. This movement usually occurs within the fatty capsule, though in some cases the fatty capsule itself moves to a slight extent within the perinephritic fascia, or movement may occur in both at the same time. What, then, should we consider a normal and what an abnormal mobility? Upon this point there is a wide variance of opinion among writers, but all agree that any kidney whose range of mobility is less than one and a half inches should not be considered abnormally movable. It is also generally held, and probably correctly so, that the normal movement is slightly more in women than in men. An explanation for this is given in the different shapes of the renal fossæ in the two sexes.

The terms used to designate the degrees of abnormal mobility are various and often confusing. I prefer to stick to the three simple terms, palpable, movable, and floating (see Fig. 160). By palpable we mean those cases where less than half of the kidney can be felt on deep inspiration. Movable includes those cases where half, two-thirds, or even all of the kidney can be felt, but where it cannot be displaced to any other portion of the abdomen. Floating includes those cases in which the kidney can be grasped and brought up to the abdominal wall or carried to some other portion of the abdomen.

Although this classification is entirely clinical, it furnishes a good working basis. For instance, if a patient comes with abdominal symptoms resembling those which we should naturally expect to find with a freely movable kidney, and upon examination the kidney is found to be simply palpable, the chances are that it is not the cause of the symptoms. Whereas, if the kidney is found movable or floating, the physician must seek diligently to find some connection between the abnormal renal mobility and the symptoms of which the patient complains.

Etiology.—Upon no other phase of movable kidney is there so much difference of opinion or lack of any absolute proof as upon its etiology. If half a dozen prominent physicians were asked to-day what they considered to be the one most important factor in the causation of movable kidney, they would probably all give different answers.

Glénard maintained that movable kidney was not a clinical entity at all, but simply part of the general condition of enteroptosis, and he is credited with the statement that "enteroptosis can be present without nephroptosis, but never nephroptosis without enteroptosis," a statement which clinical observations do not confirm, for unquestionably there are cases of movable or even floating kidney in which no displacement of other organs can be discovered.

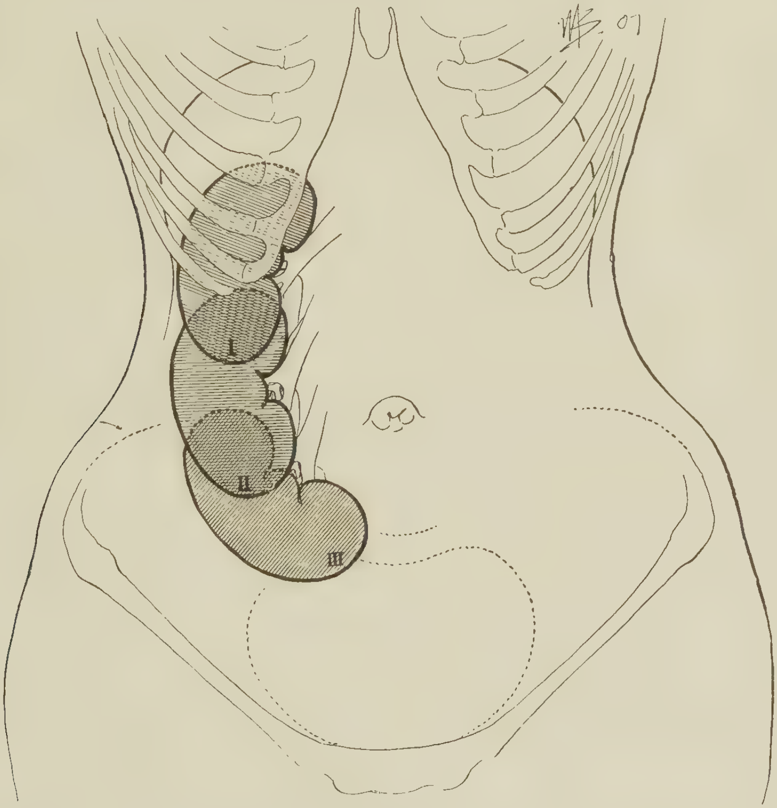

Fig. 160.—Showing Three Degrees of Displacement of the Kidney. In the first degree (palpable) the lower pole is only just perceptible to the touch. In the second degree (movable) the upper pole just emerges from under the costal margin. In the third degree (floating) the entire kidney can be palpated.

Becker and Lennhoff were the first to definitely emphasize the great importance of body-shape as an etiological factor in nephroptosis. These writers maintained that the vast majority of persons having a movable kidney had also a peculiar form of chest and abdomen which was somewhat cone-shaped in appearance, with the apex pointing downward; while those cases in which there was no nephroptosis presented rather a cylindrical appearance. To be more accurate, they measured the distance from the suprasternal notch to the top of the symphysis pubis with the patient flat on her back, and divided this distance by the smallest circumference of the abdomen, and to avoid fractions, multiplied the result by one hundred. The index thus obtained usually varied between sixty-five and ninety-five, and in practically every case in which there was marked nephroptosis, the index was high, that is, above seventy-five.

Becker and Lennhoff also examined many South Sea Islanders, with whom the customs of civilization, as clothing, tight lacing, etc., could be eliminated, and found that movable kidney was just about as frequent as in civilized races.

Deletzine and Volkoff ascribe the more frequent occurrence of movable kidney in women than in men to the difference in the renal fossae of the two sexes. They showed that in men the fossæ in which the kidneys lie are fairly deep and wider above than below, that is, funnel-shaped; while in women they are more cylindrical and wider below, especially on the right side.

Pregnancy has been given the most conspicuous place as an etiological factor by some persons, and its advocates maintain that it acts by the contraction of the diaphragm during labor; the lessening of the intra-abdominal pressure after the expulsion of the uterine contents; and finally, the loss of tone of the abdominal muscles with a resultant flaccid and pendulous condition which also tends to lessen the intra-abdominal pressure and thus favor a prolapse of the kidney.

Gynecological conditions, such as malpositions of the uterus and pelvic tumors, may possibly by their traction upon the ureters have a slight tendency to displace the kidneys. Trauma, either single or repeated; certain occupations requiring heavy lifting; and also prolonged constipation necessitating severe straining, may in some instances assist in displacing the kidneys.

Harris (*Jour. Amer. Med. Assoc.*, June 1, 1901) probably came nearer the truth than any other writer when he said: " The fallacy of supposing that pregnancy, lacerations of the perineum, displacements of the uterus, etc., are instrumental in causing movable kidneys, is unanswerably shown by the fact that over forty per cent of the cases of movable kidneys were found in unmarried women, in women who have thus never been pregnant, who have intact perineal floors, and whose uteri are in normal position. That these factors may, and perhaps at times do, aggravate the condition caused by other influences is admitted."

We may conclude by saying that it is becoming more and more probable that there is no single cause of movable kidney, but rather a combination of influences working together.

Frequency.—It is a well known fact that movable kidney is much more frequent in women than in men. Statistics vary greatly as to the relative frequency in the two sexes, but it is probably ten times more common in women. The disposition of the pelvic organs in women, together with the effects of labor, are probably of some etiological importance, but it will most likely be proven that the differences in the body shape in the two sexes is also of great consequence.

Observers vary greatly in their opinions as to the relative frequency of movable kidney in women, due in part to the fact that each has a separate standard by which he decides whether a kidney is abnormally movable. From statistics taken upon white women in the Gynecological Dispensary of the Johns Hopkins Hospital, I feel safe in saying that at least twenty per cent have a movable kidney. In most of the cases it is the right kidney which is in descensus, while in a small per cent the nephroptosis is bilateral, and in a still smaller per cent the left kidney alone is movable.

Nephroptosis may occur in children, indeed there are many cases on record, but it is rare compared to its frequency in adults.

Palpation of Kidney.—There are numerous methods and positions for palpating a movable kidney, each of which has its advantages and disadvantages, but the necessary prerequisite for a thorough palpation of any kidney is a complete relaxation of the abdominal muscles.

Some surgeons in palpating prefer to use only one hand; for example, in examining the right kidney they use the left hand, placing the fingers in the loin below the twelfth rib and external to the erector spinæ muscles, with the thumb on the abdomen, and attempting to palpate the kidney by bringing fingers and thumb together. I prefer the bimanual palpation, however, which is performed as follows: In palpating for the right kidney the left hand is placed in the loin below the twelfth rib and just outside the erector spinæ muscles, and the right hand is placed over the abdomen just below the costal margin external to the rectus muscle. The patient is then instructed to take a fairly deep breath, and during expiration the hands are brought together. As mentioned above, the whole secret lies in securing a thorough relaxation of the abdominal muscles, and to obtain this the position of the patient is most important. She may be on her back in a reclining position, about midway between the sitting posture and complete dorsal decubitus, and with the thighs slightly flexed. This usually gives a good relaxation, there is some tendency for the kidneys to descend by gravity, and either side may be examined without changing the position of the patient. Another excellent position is to have the patient stand, and in order to examine, for instance, the right kidney, have her lean forward and a little to the right, with the right foot placed on some object about six inches high. This will secure good relaxation and give gravity full play. Another method is to place the patient in the left lateral or Sims' position to examine the right kidney, and in the right lateral position to examine the left kidney.

It sometimes happens that a movable kidney can be distinctly felt at one examination, but cannot be made out subsequently, owing to the fact that it has slipped up under the ribs and is temporarily held in that position. Frequently, however, if the patient will walk briskly about or make some exertion, the kidney will fall down into its abnormal position and be easily felt.

In some cases it is helpful to try the bimanual vibratory palpation as described in the *Journal of the American Medical Association*, June 1, 1907. This method is performed as follows: With one hand placed below the lower pole of the kidney, or tumor, as the case may be, the other hand makes light taps over the mass at the rate of about three to five a second, and with an amplitude not exceeding one centimetre. As long as the palpation is made over the mass the vibratory waves are transmitted to the under hand, but just as soon as the outer limits are passed, these impulses can no longer be felt, and thus any object can be more accurately outlined than by the ordinary methods of palpation.

Symptoms.—Probably no other pathological condition in the abdomen presents such varied and often vague symptoms as movable kidney. The symptoms in a great many cases are so far distinct from, and have apparently so little connection with the kidney, that they are frequently attributed to some other organ. A large proportion of the movable and also of the floating kidneys do not cause symptoms. Nearly every practitioner of much experience can recall cases in which the kidney had "run wild" and could be displaced to the iliac fossa or even to the opposite side of the abdomen, but which had caused absolutely no discomfort. While on the other hand, a comparatively slight abnormal mobility has caused violent manifestations of pain, nausea, vomiting, etc., which have been completely relieved by proper treatment of the kidney. Whenever, therefore, in the routine examination of our patient we accidentally discover a prolapsed kidney of which the patient is ignorant, and which has given her no trouble, it is best to let well enough alone and avoid interference; it is of great importance that the patient should be kept in blissful ignorance of her condition, for it frequently happens that the very knowledge of the fact that the kidney is out of place will induce a long train of the mental and nervous disorders known as neurasthenia.

Pain.—The cardinal symptom of movable kidney is pain, which, however, varies greatly both in character and intensity in different cases, and even in the same person at different times. The pain commonly associated with movable kidney, however, is a dragging or aching sensation, which may be so mild that the patient is barely conscious of its existence, or, in many cases, is so severe that she cannot keep about at all, and is only partially relieved by lying down. The attacks of intense pain, called "Dietl's crises," are present only in exceptional cases.

Dietl (*Wien. med. Wochensch.*, 1864) considered these "crises" to be the result of a temporary kink or twist of the renal vessels and a consequent strangulation; comparable in character to the strangulation of a hernia. The explanation now generally accepted and advocated especially by Osler is that the paroxysms are due to a kink in the upper part of the ureter, causing a damming back of urine into the pelvis and calices, and thus a transient hydronephrosis. The artificial reproduction of the exact symptoms of a

Dietl's crisis by the distention of the kidney with sterile water, which will be described later, certainly seems to substantiate this view.

An attack of sharp pain may excite the first suspicion, either to patient or physician, of an abnormally movable kidney, for although there may have been previously slight aches and pains, they are usually ascribed, without an examination, to a "touch of indigestion," lumbago, or neuralgia, until acute symptoms necessitating a thorough investigation clear up the diagnosis. These paroxysms usually come on rather suddenly, often following severe exercise, jolting, or even an indiscretion in diet. The patient is seized with a sharp agonizing pain in the region of one of the kidneys, accompanied by a feeling of nausea and faintness. The pain is most frequently confined to the region of the kidney, but it sometimes radiates downward along the course of the ureter, or across to the other side of the abdomen, or upward even to the shoulder-blade. If seen within the first hour or so after the onset, a correct diagnosis can usually be made, for on examination the physician discovers slight enlargement of the kidney, which upon palpation causes an accentuation of the symptoms of nausea, faintness, or even partial collapse, from which the patient is already suffering. In the most severe cases, after several hours there may be marked abdominal distention and tenderness, and the patient becomes bathed in a cold sweat, so that the condition could be easily mistaken for one of intestinal perforation or even of peritonitis. Sometimes the symptoms continue severe for several days, but, as a rule, within twenty-four hours the pain and tenderness subside and the patient makes a rapid recovery.

There may be a noticeable decrease in the amount of urine, with albumen, casts, or even blood voided during an acute attack, followed by a compensatory increase of pale urine with low specific gravity during the subsidence of the symptoms.

A marked temporary hydronephrosis, occuring in a Dietl's crisis, affords a typical example of the so-called "phantom-tumor," for on examination a large mass can be outlined in the flank, which a day or so later has completely disappeared.

Between the Dietl's crises the health of the patient is most commonly excellent, except for occasional slight dragging pains and some discomfort, but she is kept in a constant state of anxiety, knowing that the slightest error in exercise or diet may precipitate another attack.

The great danger to be feared in these cases of temporary or intermittent hydronephrosis is that they will become changed into a permanent hydronephrosis or even pyonephrosis.

Gastro-intestinal.—Although gastric symptoms are not common manifestations of movable kidney, yet symptoms referable to the stomach, intestine, appendix, or gall bladder are occasionally seen.

As a rule, the symptoms are mild in character and amount only to slight flatulence, dyspepsia, or constipation, but they may be so severe as to simulate acute gastritis, gastric ulcer, appendicitis, or gall stones. Moullin (*Lancet*, December 10, 1904) reported an interesting case in which the symptoms resembled those of gastric ulcer: "The patient was a married woman, forty-four years of age, who had had nine children, six of whom were living. For the last twenty years she had suffered from pain in the epigastrium, shooting around to the back and shoulders. The pain invariably came on from a quarter to half an hour after meals. Solid food made it worse, vomiting was frequent, and was rather encouraged as it relieved the pain. Scarcely a day passed without at least one attack, and for the past nine months there had been no respite. Twenty-one months ago there had been three attacks of hematemesis, the amount said to have been as much as three quarts, and there was melena at the same time. The abdomen was large and flabby. According to the patient's account she had been getting thinner. The stomach was not dilated nor displaced, the lower border being situated about two inches above the umbilicus. There was a little tenderness on deep pressure to the right of the epigastrium, but no tumor could be felt. Both kidneys were movable, the right one in particular descending so far when the patient strained or coughed that it came quite below the thorax and the hands could be made to meet above it. While in the ward lying in bed waiting for operation, the vomiting, which had been more and more troublesome and which was the immediate cause of her seeking admission, ceased entirely, and the pain after food diminished so materially that it scarcely interfered with her comfort. This led to the conclusion that the mobility of the right kidney was the chief, if not the sole, cause of her symptoms, whether it acted mechanically by dragging upon the duodenum and pylorus, or whether it irritated the splanchnics in some way, leading to persistent congestion of the mucous membrane of the stomach with its attendant consequences, chronic gastritis and hematemesis." In this case the kidney was suspended with complete relief of the severe pain and vomiting.

The ease with which nephroptosis may simulate appendicitis is well shown by a case which was operated upon at the Johns Hopkins Hospital about four years ago (Gyn. No. 10977). The patient, a colored woman, age twenty-four, had had neither children nor miscarriages. She had always suffered from dysmenorrhea and irregular menstruation. Until December 18, 1903 (about three weeks before her operation), she had not menstruated for six months, but she had suffered practically no pain. On the above date the menstrual flow began and lasted two to three days, accompanied by pain in the right side of abdomen, which persisted off and on, growing more and more severe and cramp-like in character. The attacks of pain were accompanied by nausea, vomiting, and obstinate constipation, and the patient was confined to bed for two to three days during each attack. She said that during the acute symptoms she had no desire to urinate, and frequently did not void her urine for two or three days, and when she did there would be only a small amount which caused some smarting and burning. Owing to the rigid condition of the abdomen, the physical examination was very unsatisfactory, and although the right kidney was found movable, it was not suspected as the seat of the trouble. A diagnosis of appendicitis having been made, a laparotomy was done and a normal appendix removed. As the symptoms continued and the operation did not reveal any cause, the kidney was suspected. Sterile water colored with methylene blue was injected into the right kidney, which reproduced the exact symptoms of which the patient complained, proving conclusively the renal origin.

Biliary.—Attacks of colic in the right side accompanied by nausea and vomiting as well as intense jaundice seem characteristic of gall-stones, but all of these symptoms may be caused by a movable kidney. I recently had such a case in which I made a diagnosis of gall-stones and then did an exploratory laparotomy which disclosed a normal gall-bladder and gall-ducts, but showed the right kidney pressed against the common bile-duct. I closed the abdominal incision, put the patient upon a kidney-bag, and suspended the kidney. She recovered promptly from the operation and has now been perfectly well for about two years.

Nervous.—Although the nervous manifestations of a movable kidney are vague and indefinite, they are none the less real. Headaches and vertigo are common. A bright and cheerful person may become fretful and irritable, and in extreme cases even approach hypochondriasis.

Circulatory.—Venous congestion and edema of the leg have been reported as occurring in association with movable kidney, but it must have been an exceptional case. I have never seen one of the kind myself. It is worth noting, however, that Rayer attributed a swelling of the leg which he found at an autopsy to a movable kidney present upon the same side.

Urinary.—Except for the changes in the amount of urine occurring in a Dietl's crisis, the urinary manifestations are not very characteristic. There might be a little albumen or a few casts, but these occur in so many conditions that it is difficult to say whether it is the result of or merely coincident with the nephroptosis. Occasionally, a little blood is seen in the urine by the aid of the microscope, and a few years ago Cabot, of Boston, reported a case of severe hematuria with anemia and weakness, resulting from a movable kidney, all of which were relieved by nephropexy. The occurrence of hematuria, however, would indicate that some other change in the kidney was associated with the movability, and we know that bleeding kidneys which are not movable have been cured by nephropexy.

Differential Diagnosis.—The great majority of the cases of movable kidney with or without symptoms can and should be correctly diagnosed by any practicing physician; but on the other hand, there are a certain number of cases which puzzle even the best of clinicians. As I have said before, we should always hesitate a long time before ascribing any symptoms to a movable kidney unless the kidney can be felt, and even then we should try to eliminate pathological conditions of any other abdominal organ. After a positive diagnosis has been made, the physician will be perplexed over and over again to know just how much of the symptoms of which the patient complains should be attributed to the faulty position of the kidney and just how much to a neurotic element.

I will mention briefly some of the conditions with which movable kidney is most likely to be confused, and give a few points of differential diagnosis.

Distended Gall Bladder.—A very movable right kidney may descend to the left so far as to protrude as a rounded organ beneath the margin of the liver and be confused with the gall bladder. By manipulating the kidney or by turning the patient on her right side, it may be forced back into its normal position. In these cases there is usually a sufficient absence of previous history to suggest involvement of the gall ducts, and the jaundice which may occur is said to be not so intense as that caused by a tumor of the gall bladder.

Although both the kidney and gall bladder move with respiration, the former can be grasped and held down during expiration, while the latter cannot. The gall bladder can be moved to the right or to the left but not downward, while a freely movable or floating kidney can be displaced in almost any direction. Also the edge of the liver can usually be felt separate and distinct from the movable kidney, whereas, between the gall bladder and liver there is no sharp and definite demarcation. The position of the colon, especially when distended, may in some cases be helpful in differentiating the two conditions.

A movable kidney when displaced has a tendency to slip back into its position in the loin, whereas a gall bladder, although it may be pushed back into the loin, will tend to spring forward to the anterior portion of the abdomen.

It must be borne in mind that a movable kidney and a distended gall bladder frequently occur in the same person, and each may cause symptoms.

Tumors Arising from the Pelvis.—That a floating kidney may be confused with tumors arising from the pelvis is well shown by a case operated upon at the Johns Hopkins Hospital. A white woman, age forty-six (Gyn. No. 10286), mother of six children, entered the hospital in February, 1903, with the following history: In September, 1901, she noticed considerable soreness in both groins, and while palpating her abdomen observed a lump in her right side which she could move about almost anywhere in the abdomen. In February, 1902, she consulted a physician, who examined her and told her she had an ovarian tumor. Since then she had had considerable discomfort on the right side, mostly a dull, throbbing, aching pain, which was usually confined in the right groin, but which at times ran upward under the "small ribs." The pain was worse at night and patient rested best on her left side. She had had backache ever since she had borne children. Her appetite was good, her bowels regular, and micturition normal. After a thorough examination, including a distention of the kidney with sterile water and reproduction of the exact pain, a diagnosis of movable kidney was made, and nephrorrhaphy done, with a complete relief of symptoms.

Before venturing a diagnosis in doubtful cases between movable kidney and a tumor of pelvic origin, a vaginal or rectal examination should always be made, for in many cases a distinct pedicle can be felt connecting the tumor with the pelvis, which instantly clinches the diagnosis.

The order of frequency of the various tumors arising from the pelvis which are confused with the kidney is, probably, ovarian cysts (usually dermoid); pedunculate, subserous, uterine myomata; and occasionally parovarian cysts. Naturally, these tumors would have to be fairly small and with a long pedicle.

The points to be emphasized in differentiating these tumors from movable kidney are:

(1) A careful history of the onset and duration.

(2) Impossibility of displacement upward behind the ribs into the loin.

(3) Possibility of feeling tumor on vaginal or rectal examination.

(4) Possibility of distinguishing a pedicle, on vaginal or rectal examination, felt to connect the tumor with the pelvis.

(5) Movement in the arc of a circle, whose centre is in the pelvis.

(6) A gradual increase in size demonstrated by careful observation.

Tumors of the Pylorus.—A case reported by Osler ("Lectures on the Diagnosis of Abdominal Tumors"), in which he mistook a tumor of the pylorus for a floating kidney, illustrates the similarity which may occur between the two conditions.

His case was a colored woman, aged fifty-six years, who entered the hospital complaining of pain in the abdomen and vomiting. She had been married twelve years and had had six children and four miscarriages. She was always healthy until the onset of her present symptoms, which were entirely of a gastro-intestinal nature, about four months before her admission.

The physical examination was as follows: "The walls are very loose, flabby, and thrown into many folds. In the right hypochondriac and right epigastric regions there is a marked rounded prominence, which extends below to within two centimetres of navel and reaches nearly to middle line. It descends slightly with inspiration. On palpation this proves to be a solid mass, which can be grasped and is freely movable. It is irregular, rounded, not reniform, but is smooth at its upper and right borders, more irregular below and to the left, but a definite hilum is not to be felt. To the touch there is conveyed a sense of firm yet elastic resistance, such as is given by a solid organ. On prolonged palpation no gas is felt passing through it. It is extraordinarily mobile and can be pushed into the epigastric region far over into the right hypochondriac region, and below into the right lumbar and iliac regions to a level with the line of the anterior superior spines. On firm pressure the liver margin can even be forced into the iliac region. It can also be pushed into the right hypochondriac region, so as to be covered almost completely by the ribs, and in subsequent examinations this was not infrequently the situation in which it was found, and from which it could be dislocated only by the deepest inspiration or by deep pressure in the renal region. The mass is not tender even on firm pressure. There is dulness over it, but not complete flatness. The patient notices that the mass changes in position as she moves about, and when she sits up it moves far down into the abdomen, while when on her back it is frequently beneath the right ribs. When this mass is out from beneath the right costal margin the right kidney cannot be felt, nor on the left side on the deepest inspiration, could the kidney be palpated. Beyond these are depressions in the renal regions. The edge of the liver cannot be felt; the area of splenic dulness is not increased; the edge cannot be reached even on deep inspiration."

In discussing the case, Dr. Osler mentioned the possibility of a pyloric tumor, but concluded by saying: "Here the mass is of unusual mobility and can be passed into the renal region on the right side. It has not a reniform shape, but it has the consistence and resistance of the kidney. A point very much in favor of its renal character is the mobility downward, and a tumor of this sort, which can be pushed up beneath the ribs and also far down to the iliac regions, is certainly highly suggestive of floating kidney. Another important fact is that, in a woman with such a lax abdominal wall, no right kidney can be felt. The gastric disturbance and dilatation of the stomach present are both explicable on the view that this tumor mass has compressed the duodenum and caused a secondary dilatation. Nor is this, considering the history of so many cases, inconsistent with the view that the tumor mass may be really a kidney. On the other hand, the tumor has not the shape of a kidney and a distinct hilum cannot be felt. No left kidney can be palpated, and it may be that this is an instance of conglomerate kidney, such as was found in Polk's celebrated case."

An exploratory laparotomy showed the tumor to be a solid growth of the anterior wall and lesser curvature of the stomach in the pelvic region.

It is very rare that a case as confusing as this one is encountered, for if a careful history is taken with especial reference to the duration of symptoms and loss of weight and strength, and a thorough physical examination is made, combined with a microscopical and chemical examination of the gastric contents, a diagnosis is usually not difficult.

Nephrolithiasis.—Stone in the kidney or nephrolithiasis may give symptoms which closely resemble those occurring with a movable kidney, and *vice versa.* For a differentiation, a careful microscopical examination of the urine, together with its reaction, is important, and it is especially helpful to contrast the urines obtained by catheterization of each ureter. The urine obtained from catheterization of the ureter on the suspected side should be examined for small fragments of calculus which may be brought down.

The X-ray is naturally a valuable aid in differential diagnosis, but it cannot always be relied upon, for the stone may be so soft or else so located that it is not shown on the radiograph.

A more valuable means of diagnosis is the wax-tip catheter, which is made by immersing the end of an ordinary ureteral catheter in a mixture of dentist's wax and olive oil. This is then passed up into the kidney, withdrawn, and examined with a hand-lens, when, if a stone is present, little gouges or excavations can be seen in the wax, whereas a normal pelvis or ureter will leave the tip unaltered (see Fig. 27, p. 29).

Fecal Accumulations.—The beginner, in palpating for a movable kidney, may sometimes be confused by the accumulations in the colon, but after a little practice the soft boggy feel of the feces becomes almost pathognomonic.

Probably the best single means at our disposal of differentiating pathological conditions of the kidney, especially movable kidney, from affections not of renal origin is the artificial reproduction of renal colic. For those who may be interested, this method is published by Kelly (*loc. cit.*) and H. T. Hutchins (*Amer. Jour. Obst.*, 1906, vol. 54, p. 331), and will be described here only briefly.

After a thorough history relative to any previous kidney or bladder trouble is obtained, the patient is told that the bladder will be examined, and nothing is said of the kidney. With the patient in the knee-breast position, a catheter just large enough to fill the ureter is passed up into the renal pelvis; the patient is then allowed to lie on her side, and the rate of flow of urine from that kidney is carefully noted. A syringe filled with sterile water colored with methylene blue is now attached to the catheter and the fluid is slowly forced into the kidney, the exact amount being measured, provision having been previously made to collect reflux, should any occur. As soon as the pelvis is moderately distended, there will naturally be some pain, and almost invariably the patient will, without any questioning, volunteer the information as to the character of the pain, whether it is the same pain of which she has previously suffered or not. If her former pains are not reproduced, the chances are that the kidney is not at fault; if they are reproduced, there is very little doubt as to the renal origin.

It is a good plan in studying a movable kidney to make an aniline outline according to the method described in Chapter I, p. 17, and then to transcribe this to a gauze record as shown in Figure 161.

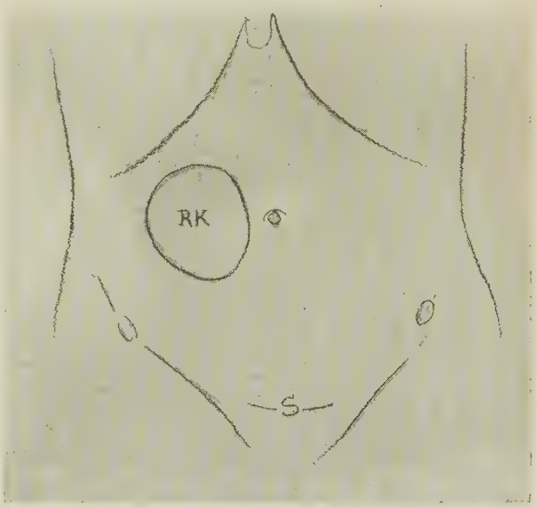

Fig. 161.—Gauze Record of Displacement of the Right Kidney.

Treatment.—As in other pathological conditions, so in movable kidney, there are numerous treatments which, although harmless *per se*, are yet dangerous in that they give false hope and consume the time which should be given to more effective measures. I refer to such as electricity, massage, and cold showers, which theoretically tone up the weak and flaccid abdominal wall, increase the intra-abdominal pressure, and give a better support to the viscera, but which practically are of very little value.

Palliative.—Among the palliative, or to speak more correctly, non-operative forms of treatment for displaced kidney the bandage is, perhaps, the most important. In many cases a properly fitting bandage, combined with the use of suitable gymnastic exercises, not only affords temporary relief, but effects a permanent cure. The cases suited for treatment by means of a bandage are numerous; indeed, the only class in which it is contra-indicated are those in which hydronephrosis has begun, and these can be readily excluded by catheterization and injection of the kidney. A properly fitting bandage should give relief as soon as it is put on. There is no fixed period of time during which it should be worn. It is of great importance that gymnastic exercises should be employed in connection with the bandage, in order to strengthen the abdominal muscles. These can be taken in the morning before the bandage is put on or in the evening after it is removed. They consist of some form of bending movements which bring the abdominal muscles into action, and the physician should prescribe those which he thinks most likely to be beneficial in each case. Many patients with a displaced kidney are much emaciated, and in such cases everything should be done to increase the body weight. Specific directions must be given for diet and the kinds of food carefully selected. The methods of eating also must be regulated, and the directions on this point given for the treatment of neurasthenia will be found valuable in the class of patients now under discussion (see Chap. XXIII). With improvement in nutrition and an increase in the strength of the abdominal muscles a displaced kidney may become fixed in its normal position, and even when there is no fixation, anatomically speaking, all the symptoms may be relieved and the relief persist even after the bandage is disused. It must always be remembered, however, that there are some cases in which it is impossible to give relief by means of a bandage, and this may be due to some anatomical peculiarity in the individual.

The bandage itself should be snugly fitting and made of an elastic material. Its upper border ought to be just below the margin of the ribs and its lower at the iliac crest. The entire lower part of the abdomen should be covered. Such a bandage should always have some kind of attachment by which it is pulled down. Any intelligent instrument maker can make such a bandage, but in no case should the physician allow his patient to definitely adopt it until he has assured himself that it fits. I have found it of service in cases where the bandage is made from measurements to send a pattern, cut from the patient. The principle of the bandage is to afford support to the lower abdomen; very occasionally additional benefit may be secured by placing an extra pad inside of it so that pressure is applied just where the kidney would descend. The bandage should always be applied while the patient is lying down. It may seem superfluous to say that before applying it the kidney should be replaced in its proper position in the loin, but, as a matter of fact, patients will often complain that they have not been relieved by a bandage or have even been made worse by it, and upon examination it will be found that the kidney is in the iliac fossa or in the opposite side of the abdomen with the tight bandage above it! In no case should a bandage be applied without first excluding all kidney disease other than the movable kidney.

In case the symptoms are not relieved and the physician has assured himself that there is no fault in its mode of application, he should begin to think of some other renal condition as the cause of the trouble and consult a specialist. It must always be remembered that certain patients are so much annoyed by a bandage that they do not improve as they should.

During an attack of renal colic the patient should be put to bed and kept flat on her back until all acute symptoms have subsided. Some sedative, as trional, codein, or even morphin, is indicated, and hot fomentations to the abdomen prove both soothing and helpful. If the gastro-intestinal symptoms are prominent, a limited diet, preferably liquid, is advisable for a few days after the attack.

Radical.—(1) Nephrorrhaphy.—"Stitching up" the kidney gives the best results of any method of treating nephroptosis of which we are acquainted. It is difficult to lay down any general rule to determine which cases are and which are not suitable for nephrorrhaphy, for each case must be decided to a great extent upon its own merits. We may, however, divide all cases of nephroptosis into three great groups with reference to nephrorrhaphy.

(*a*) Those cases in which nephrorrhaphy is contra-indicated.—Under this heading we include all cases which have given no symptoms, and especially those cases of which the patient herself is ignorant; also those cases of unilateral or bilateral nephroptosis associated with marked general visceroptosis, and in which the symptoms are relieved by a suitable binder. Even if the bandage does not give relief, nephropexy is still contra-indicated unless the symptoms are very severe and can be shown to be caused by the kidney and not by the descensus of the other viscera.

(*b*) Those in which nephrorrhaphy may or may not be done, according to influencing factors.—This group comprises the largest number of cases of nephroptosis with symptoms. What would in some cases be ample indication for an operation would not in other cases be sufficient to justify it. Naturally, we would not hastily advise an operation in a woman of the better class who leads a life of ease and who, with the aid of a binder, gets along fairly comfortably; whereas, the same pathological conditions found in a washerwoman who is upon her feet all day at hard work and to whom health is absolutely essential, would be sufficient indication for radical treatment. We must also be duly influenced by the mental and nervous condition of the patient, for naturally we can hope for and expect better results in persons who are intelligent and frank about their symptoms, than in those who are neurotic and prone to emphasize every little ailment. Probably the one most important symptom which should guide us in our course of treatment is pain, and we should hesitate a long time before advising operation solely for nervous or gastro-intestinal disorders; for these latter symptoms are so frequently associated with a neurotic temperament that unless we are extremely careful we are apt to bring a valuable operation into disrepute by applying it to unsuitable cases.

(*c*) Cases in which nephrorrhaphy is absolutely indicated.—When in spite of a quiet life, rest in the recumbent posture, and a carefully applied binder, the pain, faintness, and other acute symptoms continue, more radical treatment is absolutely indicated, both for the relief of symptoms and the prevention of complications.

A few statistics gathered from the gynecological records of the Johns Hopkins Hospital will convey an idea of the frequency of nephrorrhaphy at this institution.

In the first thirteen thousand three hundred and thirty-eight gynecological patients admitted, the right kidney was suspended one hundred and twenty-seven times. It was suspended alone in seventy-two cases, with the left kidney in ten cases, and with other operations in forty-five cases.

The left kidney was suspended thirty-eight times, in twenty-eight of which there was no other operation, while in the other ten cases the right kidney was also suspended.

In all these cases only one was in the colored race and one hundred and fifty-five in the whites. There were no deaths.

Of the thirteen thousand three hundred and thirty-eight cases admitted, approximately eight thousand were white patients, showing that of all white cases admitted to the gynecological service, less than two per cent were operated upon for movable kidney.

As mentioned previously, statistics carefully taken in reference to movable kidney among gynecological patients, indicate that it occurs in twenty per cent or more of all cases. Thus we see that less than ten per cent of all cases of movable kidney in white women are operated upon, showing how foolish it would be to advise radical treatment, simply because the kidney was in an abnormal position.

The result of nephropexy, when done in suitable cases, is excellent, being successful in nearly one hundred per cent of cases. The failures which occur can usually be attributed either to too hasty operation in cases which have not been properly differentiated, or to the fact that there is some other pathological condition in the kidney which has been overlooked and to which appropriate treatment should also have been given. Sometimes after nephrorrhaphy there is a slight dragging pain which was not present before operation, but which is so trifling compared with the symptoms relieved by operation, that the patient considers herself cured.

The mortality of nephrorrhaphy in the hands of the best surgeons is practically *nil,* while the mortality by all operators, both good and bad taken together, would probably be less than three per cent.

The advantages of nephropexy over nephrectomy are numerous and self-evident. It would be poor judgment, to say the least, to remove an organ when a conservative operation will give the same or even better results, with a far smaller mortality.

(2) Nephrectomy.—As mentioned above, nephrectomy should never be done in a simple uncomplicated movable kidney. There are, however, times when nephrectomy is necessary and the operation of choice, but then the indication is not the mobility of the kidney but some other pathological condition which is coincident with or resultant from it, such as tuberculosis, stone, or a high grade of hydronephrosis. Also it is sometimes justifiable in cases of floating kidney which have become more or less fixed in some other portion of the abdomen and cannot be replaced in the loin.

Before removing a kidney it is necessary to be sure that the other kidney is normal and capable of doing compensatory work.

CHAPTER XXVI.

POST-OPERATIVE CONDITIONS.

General health, p. 598. Constipation, p. 601. Food, p. 601. Exercise, p. 601. Local pain, p. 602. Headache, p. 603. Menstruation, p. 603. Artificial menopause, p. 604. Suppuration of abdominal wound, p. 607. Enlargement of scar, p. 608. Tenderness of scar, p. 608. Alteration in position of intestines, p. 608. Hernia, p. 609. Ileus, p. 609. Fever, p. 610.

The constantly increasing number of gynecological operations during the last twenty years has taught the medical profession many things in connection with them which were not at first understood. One of these facts is that an uninterrupted immediate convalescence, after a major, or even a minor operation, does not necessarily imply the immediate and complete recovery of perfect health on the part of the patient. A period of months, and in many cases of a year or more, must often elapse before the woman who has been relieved of a serious pelvic affection really reaches normal health once more. This retardation of complete recovery arises partly from the shock of the operation, but it is far more frequently the result of a general depreciation of health wrought by years of suffering, of disturbed sleep, of impaired digestion, of deprivation of fresh air and exercise, and, in many cases, of constant anxiety as to the outcome of the ailment. To rejuvenate vital forces which have, for a long time, been more or less profoundly exhausted, is a task which often requires much constant care and attention in the fateful post-operative period, but it is one well worth the pains, for upon the management or the mismanagement of the case at this time the patient's future well-being, in a large measure, depends. It is, as a rule, upon the broad shoulders of the general practitioner that this burden falls, and happy is he who, in these days of multi-surgery, carries this burden well. Only a small proportion of our patients are able to continue to command the services of the specialist who has done the operation for any considerable period afterwards; indeed, many of those who come from a distance are in the utmost haste to return to their homes as soon as their immediate recovery is assured and the healing of the wound will permit. These patients must, of necessity, depend entirely upon their family physician for attention during the (often prolonged) surgical convalescences of which I speak.

Let me, as far as I have light upon this important subject, dwell upon some of the important features of a home convalescence.

General Rules.—First and foremost, the golden rule for physician and surgeon alike is this: Never tell a patient that if she consents to any surgical operation, however necessary it may be, she may expect at once to be a well woman when she rises from the bed. On the contrary, inform her explicitly that she may be obliged to travel the road towards health for weeks, or months, or sometimes even longer. The operation must never be recommended as a piece of legerdemain, or in any sense a sort of a miracle, but simply as an absolutely necessary first step on the road towards health. Until this first step is taken, none of the other steps towards the goal can follow. Too often a feeling of magic associated with the operation is impressed by innuendo, or perhaps by the eager attitude of the doctor, anxious to persuade his patient to take a necessary step and to see her started on the way. Greater care in stating the case correctly, giving the operation its true share and no more, will cause fewer heartburns and reproaches, as the weary patient travels the tiresome road towards complete convalescence.

The daily life of the patient should be carefully regulated for at least a year after an operation done to remove a cause of protracted ill health. This necessity for subsequent care depends not so much upon the extent of the operation, or the size of a tumor removed, as upon the length of previous suffering, and the wearisome vigils, with consequent depreciation of the strength. A patient of this kind ought for several months to take her breakfast in bed, and then not to dress for from half an hour to an hour later. She will also do well to rest for half an hour before and after each meal, and, if possible, lie down for an hour every afternoon. In order to get the benefit of her afternoon rest, she should take off all heavy clothing, corsets, and shoes, put on a loose wrapper, and lie flat on the bed or on a comfortable lounge. Most restful of all is it to doff the day clothes down to the skin and to put on a nightgown. It is not advisable to read anything in these brief rest periods, for if she can sleep, so much the better. She ought to go early to bed, not later than ten o'clock, and this rule should be inflexible. Rest then is the sheet anchor of a convalescence. Many persons sleep better if they take some light refreshment just before retiring, a glass of milk, a raw egg, a cup of hot malted milk, a sandwich, or some crackers; occasionally, on the other hand, food taken just before sleep disturbs the rest. Bad sleepers and overnervous women sometimes wake up in the wee hours and keep lonely vigils until they are utterly exhausted; for such cases some light nourishment taken when they wake is often enough to induce sleep again.

The periods of rest by day, as well as that by night, should be taken in a well-ventilated, cool room. If there is a porch available, there is no tonic half so good as the bracing fresh air, both by day and by night, with the body well covered in a cozy bed. I believe that in the near future we are destined to hear much more about the out-of-door, open-air treatment of our surgical cases, both immediately after the operation and in the later convalescence.

The appetite and the digestion call for careful attention and supervision, and, as a rule, it is a good plan to prescribe some form of bitter tonic. The following I have often found useful:

℞ Extr. gentian, } āā . . . . gr. j
Extr. calumb., }
M. Ft. pil. i. Mitte tales 100.
S. One pill three times daily.

If there is much anemia, and iron is needed, I know nothing better than our old stand-by, Blaud's pill, given in gradually increasing doses (see Chap. VI, p. 142).

Iron may also be given effectively in combination with quinine and strychnin.

℞ Ferri sulph. exsic. . . . . gr. j
Quin. sulph. . . . . gr. ij
Strych. sulph. . . . . gr. $\frac{1}{30}$
M. Ft. pil. i. Mitte tales 100.
S. One after each meal.

In cases where nervous exhaustion is well marked, nux vomica in increasing doses, as recommended by Osler, is often beneficial. Begin with ten drops in water, three times a day, and increase the amount by one drop with each dose, until the patient takes twenty or even as much as twenty-five drops, three times a day. If there is any twitching, or stiffness of the jaws, the remedy must be discontinued for a time and resumed later, in a smaller dose.

It may be objected that such a careful course of living reduces the patient to a condition of semi-invalidism, and that, hampered by such restrictions, she has but little larger opportunity to enjoy life than before the operation, which was accepted as an open sesame to health. The wise physician will make answer that the operation was only done because it was necessary to health, and that if health can be secured, the purchase price of a longer or a shorter convalescence is not a matter of such great moment, provided the wage question does not have to enter into the calculation.

The wise patient will learn that rest and quietude have their lessons to teach, and that time thus employed may be even more profitably spent than days of bustling activity. It often happens that she who thus rests much alone, for the first time faces the real issues of life, and is for the first time startled to hear the still small voice of the long-stifled inward monitor, more potent in the formation of character than all the obtrusive noisy activities of the world of society. He, too, is a wise physician who seeks to inculcate this lesson.

The plan I have thus briefly outlined will be modified and adapted to meet the necessities of individual cases. Write over the door of every convalescent woman *festina lente*, and let it be the parting greeting after each visit. The physician will do well to have such an understanding, not only with the patient, but with her relatives as well, in order that, realizing the benefits to accrue, they may lend their hearty coöperation and refrain from vain imaginings that because the patient is not immediately restored, the operation has not been a success. There is no greater charity for a poor, self-supporting woman than to give her a good long holiday, in the country if possible. Some short-sighted philanthropic souls unfortunately take it for granted that into the hospital and out again is all that the occasion calls for, and that anything short of immediate recovery is a species of ingratitude on the patient's part.

Constipation.—For some time after most abdominal operations the patient is apt to be troubled with a constipation, which may be obdurate; the physician must see to it that the bowels are kept regular. The means of doing this are discussed at length in Chapter VIII, and I will not repeat them here further than to remark that I have found cascara sagrada the best drug, both in the period of immediate recovery as well as in the more remote. The dose of the fluid extract is ten to thirty drops, and of the tincture half a teaspoonful to two dessertspoonfuls. It not infrequently happens that cases where a large dose is needed in the beginning are able to decrease it after a little while, and by continuing to diminish it by degrees, a normal condition of the bowels is at last established, which requires no interference. I would repeat Sänger's urgent injunction—away with drugs, use general massage, give electricity over the abdomen, and insist on a natural evacuation, even if it takes days to get nature to do it unaided. This course takes courage, but it has the backing of our best men. If it is tried, it must be with conviction.

If the physician is willing to fight the battle without drugs, but finds that the general tonic remedy has not been sufficient to regulate the habit, I find the simplest and best of all means of aiding the patient is the use from time to time of a flaxseed enema. This is made in the following manner: Two tablespoonfuls of the whole seeds are put in a pint of cold water, brought to the boiling point, and boiled for ten minutes. The mucilaginous solution thus made is strained through a fine sieve and allowed to stand until tepid, when it is injected slowly into the bowel. The best time to do this is about half an hour after breakfast. An enema of this kind, being similar in consistency with the bowel movement, is calculated to have a soothing effect upon the mucosa of the bowel.

Food is an important factor in the treatment, and daily evacuations must not be expected where only small amounts are taken. The diet ought to be looked after, up to complete recovery; it should be simple and nutritious, and not too concentrated. A little food between meals serves to prevent exhaustion; it acts also as a mild diversion, helping to divide up the day pleasantly, and to relieve the tedium of waiting for the health which sometimes seems to come on leaden wings.

Exercise.—The question of exercise during a protracted convalescence is important. At first, a little at home, then out onto the porch, and then perhaps a drive, or a walk for a short distance. When the means are limited, the trolley cars often offer diversion and variety with plenty of fresh air. With the growing improvement, regular out-door exercise or employment of a character suited to strength and taste should be encouraged. It is a mistake, however, to advise anything strongly against natural inclinations and tastes. Light gardening, when available, is a most beneficial occupation. Tennis is too strenuous an exercise, but croquet and golf are excellent. When the patient is free to do as she pleases, it is often a wise plan to send her for a few months to some mountain or sea-side resort, where she can have plenty of opportunity for exercise in the fresh air, coupled with pleasant companionship. Lifting and straining must be forbidden for about a year after a laparotomy, in order not to strain an abdominal scar.

Alternate rest and exercise, duly proportioned and supplementing one another, are by far the most valuable means we possess of restoring complete health. And although these simple natural processes are by no means so dramatic and so impressive as some of the other resources of our medical armamentarium, they are, nevertheless, by far the most valuable; and, albeit they seem so simple, by far the most difficult to use correctly and successfully.

Local Pain.—Of all the distressing sequelæ, pain is the most likely to plunge the patient who has been through an operation into despondency, and to delay the convalescence. It is a fact that an habitual pain does not by any means always disappear immediately after the operation, even when the cause has been removed. As a rule, it is relieved at once, but where it has existed for years, and especially where much morphin has been given, the "pain-habit" may be established, and it takes time and close attention to break it off. The experienced physician will always assure his patient in advance that the continuance of a certain amount of suffering is not inconsistent with its complete disappearance in the near future. He must exercise extreme caution in using remedies for pain at this time, as the risk of a drug habit is as great as before the operation. A patient of some moral fibre will often bear the pain cheerfully when assured that it will soon go. If she is hypersensitive, nervous, and lacking in force of character, it may be necessary to give some relief, but it must not be any form of opium, and it ought not to be a drug; it should come from the moral force of the physician himself, as he upholds and carries the weakling along, day by day, until she can at last stand alone. If any drug is given, it ought to be in the physician's hands and not in the patient's, who is always safer if she does not know what she is taking.

The worst sufferers and the most difficult to control for some time after an operation are those women who have been in the habit of taking morphin to relieve their pain. I have cured a great many morphin maniacs by doing an operation and then, after the patient is confined to her bed and I have entire control of her, I do not allow any sedative whatever to be given. There may be a great deal of suffering for a few days or a week, but she comes out of her trial impressed by the fact that she is able, after all, to bear some real severe pain without the drug. In this way a certain amount of moral force is developed in a character which seemed before to be lacking. In other cases the habit is best broken off gradually. The patient may be too weak and prostrated by her disease to stand the immediate withdrawal of a drug which, in some cases, she has been taking in large amounts, as much as fifty grains per day. In such cases the large part of the battle consists in the personal interest shown by the physician, and in the moral support he gives the patient in keeping up her courage as she joins with him in the fight for emancipation from the enslaving habit. The battle with the drug can always be won if the physician adopts the right attitude, and secures first the confidence of the patient and then her coöperation. It is most important during the stress of the battle to keep careful watch upon any visiting relatives, friends, or old nurses, who may undo all the good that has been accomplished by bringing in the drug in an underhand way.

There are a certain class of hysterical patients who are inclined to exaggerate suffering and who refuse to acknowledge the relief they have received; these call for extreme patience and a calm judicial treatment of their complaints, coupled with persistence in a right course when it is once carefully mapped out.

Headache.—Besides the pelvic suffering associated with the particular lesion from which the patient has suffered, there is sometimes a tendency to headache, which only time can overcome. These headaches, as a rule, are the expression of an exhausted nervous system, whose capacity for resistance has been sapped by long-continued ill health; they disappear as vigor comes back and the nervous system regains its tone. In some cases, nux vomica in substantial doses (twenty to twenty-five drops) will do much to give relief, but the best dependence is time, with fresh air, and the slower process of building up the general health. Local pains and headaches are often good gauges of the patient's staying powers. If the pain comes on after walking, driving, or any other exertion, it may, as a rule, be taken as an indication that the patient has rather exceeded the wise limit of her strength; and if, in time, the headaches show no tendency to decrease in severity or frequency, it is evident that the nervous system is still over-taxed and the cause must be sought out.

If there is no steady improvement in the patient's general or local condition from month to month, it is always best to communicate with the specialist who had her under his care; but if the improvement is steady, however slow it may be, there is no reason for anxiety.

Menstruation.—Most of the affections in women for which pelvic operations are performed are accompanied by disturbances of menstruation, and it may be some time before the function is again normal in its performance, even though the abnormal conditions which led to its disturbance are removed. All such patients must be extremely careful during menstruation for a considerable time. It is, as a rule, best at first to remain in bed as long as the flow lasts, and the ordinary habits of life at that time must be resumed with caution. For some patients it is sufficient to spend the first twenty-four hours of the period in bed. Curettage of the uterus is almost always followed by some disturbance of menstruation, especially as regards amount, which is often excessive for one or two periods, although sometimes the flow is temporarily absent or scanty. When the curetting has been done for the relief of menorrhagia, it often happens that the first menstrual period, and it may be the second and the third, will be as profuse as before the operation, or even more so, a fact which is apt to excite apprehension in the patient's mind, lest the operation has been a failure. It is important, therefore, for the physician to assure her that the difficulty is one of common occurrence and will subside spontaneously in the course of a few months. It is best for the physician to tell the patient before any pelvic operation that she must not expect her menstrual period to be normal immediately afterwards. In this way he will relieve a great deal of apprehension when the period is delayed, or when it is excessive.

Artificial Menopause.—When an artificial menopause has been induced, the patient will experience more or less of the discomforts incidental to the normal change of life. The severity is in proportion to the age of the patient; that is to say, the nearer she is to the normal menopause the less will be the discomfort, but if the artificial cessation of menstruation occurs early in life, the disturbances accompanying it are most distressing. They are generally first experienced about the time when the next period after the operation should appear, and they usually continue for eighteen months to two years. In exceptional cases, they last for as much as five years. Waves of heat and flushes passing over the body at intervals like a draught of hot air are the commonest of these manifestations; sometimes the face is reddened and there may be a feeling of giddiness. Some patients complain of a sensation of a gulf suddenly yawning before them, accompanied by a dread of falling into it. These sensations last for a few seconds to several minutes, and after they subside, there is a feeling of great exhaustion, while the skin is covered with perspiration. Some persons suffer from great depression, almost amounting to melancholia, while others are troubled with constantly recurring headaches. Sometimes the symptoms recur at regular intervals corresponding to the menstrual periods; in other cases there is no definite periodicity. Obscure rheumatic pains in different parts of the body are a frequent symptom, and localized edema of the hands and feet may be observed.

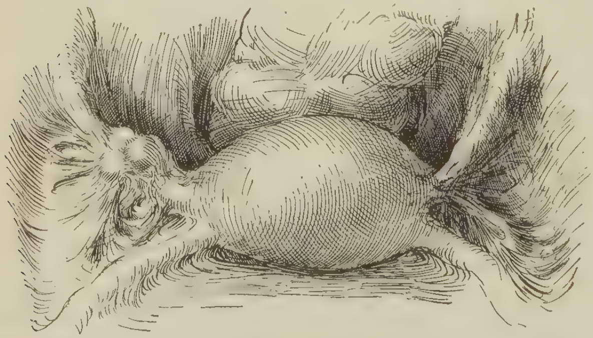

FIG. 162. — DIAGRAM SHOWING NODULE OF OVARIAN TISSUE ADJACENT TO THE RIGHT UTERINE CORNU AND CAUSING MENSTRUATION. In this case a double oöphorectomy had presumably been done.

I have repeatedly had patients come to me, more frequently ten or fifteen years ago than of late, who had been operated upon for some pelvic disease, which in the judgment of the surgeon had necessitated the removal of both ovaries, who yet continued to menstruate regularly. After some experience with this class of cases, I was able to aver that on opening the abdomen I would find traces of ovarian tissue and corpora lutea at one or other cornu uteri (see Fig. 162), in the form of a few little nodules cut off close to the ligature. Sometimes this little bit of ovarian tissue does a great deal of mischief by forming a hematoma or a cyst (see Fig. 163), and contracting adhesions to the neighboring loops of intestines. In cases of this kind there has often been a localized infection.

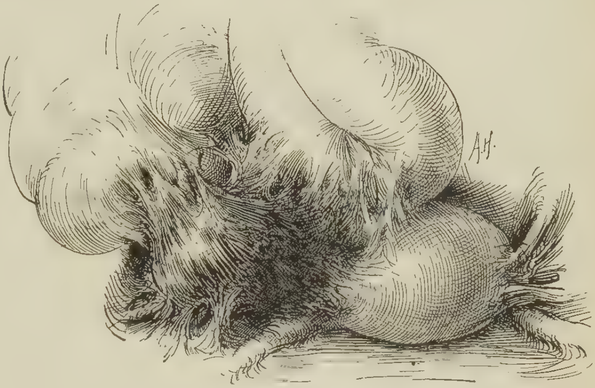

Fig. 163.—Diagram showing the Results of Hematoma Formation and Infection Arising from a Nodule such as shown in Fig. 162.

Schmalfuss ("Zur Castration bei Neurosen," *Arch. f. Gyn.*, 1885, vol. 26, p. 1) divides the neuroses occurring under these circumstances into the following classes:

(1) Symptoms referred to the lumbar section of the spinal cord, such as throbbing and pain in the back, pain in the iliac region, pain extending from the back to the abdomen and radiating down the thighs, pressure in the pelvis, downward tugging, anesthesia or hyperesthesia of the vagina and vulva, and pain on urination and defecation.

(2) Neurotic symptoms localized in different parts of the body, such as cardialgia, pressure in the epigastrium, sensation of fulness, belching, vomiting, and globus hystericus.

(3) A distinct neuropathic condition, with general pain, vasomotor disturbance, vicarious menstruation, respiratory, gastric, and intestinal attacks of various sorts, cramps, and epileptiform convulsions.

Of all the sequelæ following the production of an artificial menopause, insanity is the most important. It may, however, occur after any pelvic operation, and even after one done for some condition belonging to general surgery. The class of women most apt to become insane under such conditions are those who have well-marked neurotic temperaments, and in women of this kind, especially if there is any family history of mental disease, the induction of an artificial menopause for any reason less important than the preservation of life would seem to be contraindicated.

The treatment of the symptoms accompanying the artificial menopause does not differ in any way from that of the same conditions occurring with a normal change of life, and will be found described in Chapter III (see p. 87).

I have been able to give a great deal of relief in these cases by the administration of lutein in twenty grain doses, three times a day; in some cases given continuously, in others given periodically when the discomforts are greatest, and continued for about ten days at a time. The lutein is made by squeezing out the corpora lutea from the ovaries of the pig obtained at the slaughter-house. The corpora are then rapidly dried, powdered, and compressed into tablets. In many instances I have obtained remarkable results from the use of this remedy. I have not found the ordinary ovarian extract made from the dried tissues of the ovary itself of any particular value.

There is one prescription, which I give here, that I have found to be most beneficial in the class of women now under discussion:

℞	Strych. sulph.	gr. $\frac{1}{30}$
	Atrop. sulph.	gr. $\frac{1}{300}$
	Extr. calumb.	gr. j

M. Ft. pil. i. Mitte tales 30.
S. One pill three times daily.

Phlebitis.—Phlebitis is an inflammatory affection of the veins, resulting in the formation of a thrombus, by which the lumen of the vein becomes occluded. In the milder forms of phlebitis the occlusion is only temporary, lasting little over a couple of weeks, but in the severer grades the venous lumen is permanently occluded, and the return blood is compelled to find new channels.

There are two forms of phlebitis, the septic and the non-septic. Septic phlebitis is especially noted in puerperal cases and after septic operations, and is, therefore, but rarely encountered as a sequel to gynecological procedures. I speak here only of those forms of phlebitis which are seen in the lower abdomen and the legs, more particularly in the femoral veins.

Phlebitis may begin in the deep veins of the pelvis, as evidenced by the fever and location of the pain before the onset of the femoral phlebitis. The commonest site of the pain and tenderness at first, however, is over the femoral vein right under Poupart's ligament, from which point they extend in a characteristic line down the thigh, following the great vessels. Krönig believes that the phlebitis usually begins in the femoral vessels and that it is mechanical in its genesis. The usual time of onset is about two weeks after the operation of which it is the sequel.

The cardinal and distressing signs of phlebitis are:

(1) Pain in the pelvis and the thigh affected.

(2) Edema of the leg.

(3) Embolism, formed by the thrombus breaking loose and migrating to the lungs.

Fever, usually of a low grade and short duration, is observed preceding and accompanying the attack.

The danger of embolism is over before the patient leaves the hospital, and therefore does not concern the general practitioner in his management of the case after she has returned to her home.

I have observed phlebitis after the following operations:

Hystero-myomectomy	24	times
Removal of the vermiform appendix	2	“
Removal of ovarian cysts	8	“
Exploratory laparotomy	3	“
Salpingo-oöphorectomy	6	“
Hysterectomy for cancer	4	“
Suspension of the uterus	7	“
Suspension of the kidney	3	“
Repair of the relaxed vaginal outlet	10	“
Opening and draining of a pelvic abscess	1	time

The treatment of phlebitis is never one of active local therapy. A patient suffering from it must not be hurried home from the hospital, but should stay at least five weeks in bed on her back after the onset of this troublesome complication. When the patient reaches home she is liable to suffer from pain and from the swelling. The course of treatment should then be, first of all, expectant. She must understand that no great improvement is observable, as a rule, in a period of time less than eight to twelve months. Patience must therefore be inculcated from the first. An elastic bandage applied each day before rising gives much relief by supporting the limb and preventing edema. The patient should spend much of her time in rest, and keep the limb elevated. Massage is helpful in restoring the circulation. If there is much swelling of the superficial veins during convalescence it should not be interfered with. I know of a case in which the enterprising doctors dissected out the swollen veins of the thigh and abdomen which formed the relief circulation; the result was a gangrene of the thigh calling for a hip-joint amputation. I do not recall any case of phlebitis which has not recovered, though the improvement in some cases has been not less than two years in coming.

Suppuration of the Wound.—A suppuration developing in the wound some time after the operation is always a sign of a lingering infection which, as a rule, has developed in the post-operative period. This suppuration may occur in the abdominal wall covering the wound, or arise from the deeper parts. The superficial suppurations, as a rule, arise from the use of non-absorbable suture material, chromicized catgut, silk, silver wire, or silkworm-gut. In the days when it was customary to tie off the pedicles with silk (especially braided silk), it was common to note the fistulæ discharging pus, due to infection of the deep ligatures. Every case of suppuration should be treated seriously. In the acute stage, poultices should be applied, and as soon as the wound is sufficiently opened, it should be carefully examined with a crochet hook to see if there is a ligature within, which can be caught and withdrawn. It is always best for the general practitioner to be present at operations upon his patient, and to be fully informed at the time, both as to the exact operation done and the character of the sutures and ligatures used. In this way he will be able to form a better idea as to the cause of the suppuration should it occur. Some of the late suppurations arise from the slow healing of a drainage tract, in cases in which it has been necessary to drain the pelvis, because of an extensive infection. If the suppuration is more than a slight abscess, it would be best to give the patient an anesthetic, to open the wound freely, determine its cause and remove it, and then to let the wound close up with free drainage. Small areas may be cleaned out and douched with carbolic acid, in the hope of a rapid recovery.

Enlargement of the Scar.—It frequently happens that a patient who has been very thin, even emaciated, for a long time before a radical operation, in consequence of continued ill health, begins to gain flesh as soon as her ailments are relieved. If she gains in weight rapidly, the scar will yield from side to side, as the girth of the abdomen increases, until it becomes as much as two centimetres (three-fourths of an inch) or more in width; moreover, it often becomes pitted, pigmented, and unsightly. I know of nothing to improve this condition, and I do not believe that any kind of bandage does any good. There is a tendency, especially among negresses, to the formation of keloids in the scar tissue.

Tenderness of the Scar.—While the wound is young and pink, it is somewhat common for the patient to complain of soreness, itching, or shooting pains in the scar. In nervous women this tenderness may persist for years. Relief is best obtained by gentle massage and by arranging the clothing so as to avoid direct pressure on the sensitive area.

Alteration in the Position of the Intestines.—One of the sequelæ brought about shortly after the operation is alteration in the position of the intestines, and it may continue to give trouble for a considerable time. Additional loops of intestine drop down into the pelvis in order to fill the vacated space, and adhesions of the omentum and intestine over the inner surface of the peritoneum are apt to be formed. These adhesions do not, as a rule, give rise to serious trouble, though in a certain number of cases they occasion pain in the lower abdomen, with tormina, nausea, and vomiting from constant dragging upon the transverse colon and pulling the stomach downward. In some cases they occasion obstinate constipation. As a rule, disturbances of this kind do not require any interference and pass away of themselves before long, but they are occasionally so severe as to make it best to send the patient back to the surgeon who operated, in order that he may decide whether it is necessary to reopen the abdomen for relief. The release of the adhesions with an aseptic closing of the abdomen has been followed by immediate disappearance of all bad symptoms in those cases where they have been severe enough to require operative procedures.

Hernia.—The most serious of all post-operative local conditions is, of course, a ventral hernia in the abdominal scar. The number of such hernias becomes less every year, with the progressive improvement of surgical technic and the careful training of operators; nevertheless, they do occasionally occur, especially when the patient has overexerted herself before recovery was complete, and when increase in weight has been unusually rapid. There is only one form of treatment which can be relied upon for permanent relief, namely, radical operation, and such cases should be placed in a surgeon's hands as soon as possible. Palliative treatment by means of supports gives temporary relief, but as the tendency of all such hernias is to grow larger, it can be of no permanent benefit.

Ileus.—Among the more serious late sequelæ is an ileus, or a post-operative obstruction of the bowels. This untoward sequel may develop from little beginnings, such as a rumbling and twisting with pain, which grows gradually worse from week to week; or it may come on as an acute obstruction. Hand in hand with the difficulty in moving the bowels go the pains or tormina. The pain is developed by the contractions in the bowel, proximal to the obstruction; in thin patients the pattern of the contracting loops can be traced on the surface of the abdomen. With the contraction, more or less gurgling is heard.

Such a difficulty arises, as a rule, from the post-operative adhesions, either to the abdominal wall about the incision, or to the seat of the operation, as an ovarian or a uterine stump. Sometimes it is due to a broad film of adhesions (forming immediately after the operation) which by the movements of the bowel has been rolled together to form a powerful lymph as strong as a rope. As a rule, such difficulties show themselves while the patient is still in the hands of the surgeon, who must continue to supervise his patient until he is sure no late accident is liable to arise.

If mild remedies do not succeed in keeping the patient's bowels open, and if the tendency toward ileus is clearly progressive for a few days, the practitioner ought not to wait long, but should put his patient again in the care of the surgeon, in order that he may carefully consider the question whether or not the abdomen ought to be opened to liberate all adhesions. It is better to err on the side of early action in these cases, than to wait until long and exhausting efforts have robbed the patient of much of her strength before making the incision and undertaking what may prove to be a long and difficult operation.

The cancer cases which are sent back by the surgeon to die in the hands of the general practitioner must not be neglected by him. They ought, on account of their condition, to receive even more constant tender care than the more promising, hopeful cases. I have already dwelt on these cases in the chapter on inoperable cancer of the womb (see Chap. XXI). In all of these cancer cases, it is important to keep the parts clean with repeated douches and applications where the disease can be reached, to keep the bowels open, to keep up nutrition, and as long as the patient is able to bear it, to keep her in the fresh air. Mild sedatives may be used to relieve the pains at first, and later morphin will have to be used, but it is best to postpone this period as long as possible, in order to husband our resources in dealing with the pains during the last few months. The morphin should be used at first as sparingly as possible, in doses of an eighth of a grain, gradually increased according to necessity, in whatever doses may be required to relieve the suffering.

Fever is a late sequel which the general practitioner ought not to see. Any fever observed at a late date can be but the continuance of some post-operative infection, which must have manifested itself while the patient was still in bed. No surgeon ever discharges a febrile patient. If fever arises after a normal convalescence, the physician must look for malaria, and carefully consider typhoid, or some other new affection. One of my patients who had a suspension of the uterus, as she was getting well developed a mysterious fever which I could not explain in any way. She left my care and came back six months later with a tertiary syphilis!

In numerous cases I have seen malaria break out, and typhoid fever, too, in the course of the convalescence, puzzling for a time all who were caring for the invalid. Latent tuberculosis may also manifest itself in this way.

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Abdomen, chain of organs on right side of, 28.
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